
NPS Solid Waste Management Handbook

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Chapter I:

Introduction to the Integrated Solid Waste Alternatives Program (ISWAP)

Background

Solid waste is a by-product of most human endeavors. The facilities operated by the National Park Service (NPS) are not immune to this law of human nature. Since the first national parks were created in the late 19th century, park managers have had to manage solid waste generated by visitors, businesses operating in and near the parks, and by park employees themselves. The techniques utilized to manage these wastes traditionally mirrored the ones utilized by the rest of society -- incineration and/or burial of the trash. Some materials were occasionally recovered for their scrap value, but in most cases these amounted to only a small fraction of the waste generated in the park. Solid waste was generally treated as a necessary evil, and the fewest possible resources were dedicated to the removal and disposal of trash.

At the end of the 20th century, times have significantly changed. Increased visitation has raised solid waste levels to the point where they cannot be lightly regarded. The cost of collection and disposal has become a significant expense at many parks, often totalling hundreds of thousands of dollars per year. At the same time, the NPS and others have recognized that the old approaches were not necessarily the best approaches. Materials that were once considered waste are now recognized as valuable commodities that should be recovered. Efforts to prevent waste have also been recognized as an important component of any solid waste program.

The Integrated Solid Waste Alternatives Program

The NPS's Integrated Solid Waste Alternatives Program (ISWAP) was the first systematic attempt to provide coordination and guidance to parks on integrated solid waste management practices. Issued in 1991 as NPS Special Directive 91-1, ISWAP outlined five program elements in a hierarchal order (source reduction, recycling, waste combustion, landfilling, and outreach) to promote a coherent approach to a park's solid waste problem. In its original form, ISWAP was a voluntary program. Parks were encouraged to develop ISWAP plans and programs, and many responded.

Today, the lessons learned from five years of ISWAP experience have been used to refine and strengthen the program. New federal regulations affecting park-generated waste have also

been put into place, requiring changes in the emphasis of the program.

Service-wide implementation of ISWAP is the responsibility of the Park Facility Management Division (PFMD) at the NPS' Washington Area Service Office (WASO). Through the review of annual requests for ISWAP project funding, and consistent with regulatory mandates, this team defines the priorities for the program. These priorities include, but are not limited to: the development of landfill operating and closure plans, the development of park ISWAP plans, and the development of park recycling programs.

Purpose of This Handbook

This revised ISWAP manual, now entitled the *National Park Service Solid Waste Management Handbook*, provides important technical information concerning the proper implementation of ISWAP. In particular, this handbook emphasizes analyzing the entire solid waste management system within the park. During this analysis, old practices should be reviewed to determine whether they are still appropriate given changes in technology and local market circumstances. Program costs should be calculated to allow the comparison of existing program elements with potential alternatives. In essence, ISWAP is nothing less than a top-to-bottom review of one segment of a park's maintenance operation.

This handbook begins by establishing park performance goals for ISWAP that represent a serious NPS commitment to sustainable waste management practices. Subsequent sections provide the information park managers should use to achieve these goals. This handbook also assists parks in meeting the requirements of Executive Order 12873 (Federal Acquisition, Recycling, and Waste Prevention). This Order sets forth federal facility requirements to incorporate waste prevention and recycling in daily operations. It also encourages each agency to increase and expand markets for recovered materials through the affirmative procurement of designated materials. Taken as a whole, this handbook is a "how to" of ISWAP practices. Topics covered in detail include:

- Waste generation and composition, which are critical factors in understanding how much material a park must manage, which materials should be targeted for recovery, and how these factors may change over time.

- Cost-effective trash collection practices, including the use of pack in/pack out requirements in more heavily visited sections of a park.

- Waste prevention strategies, or how parks can reduce the amount (or type) of materials used or generated as waste.

- Recycling strategies.

- Composting system management.

- Disposal facility management, including issues to consider when operating a landfill or incinerator inside park boundaries, or utilizing a facility outside of the park for disposal of

park-generated wastes.

Special waste materials, such as tires, wooden pallets, batteries, scrap metals, and oils/solvents/antifreeze.

Education strategies to inform employees and visitors about the solid waste program.

The benefits and pitfalls that partnerships with concessioners, cooperating associations, and other entities can bring to a park.

Disclaimer

Although this handbook recommends certain waste management practices, it does not replace federal, state, or local solid waste management regulations and requirements.

What This Handbook Does *Not* Cover

This *Solid Waste Management Handbook* deals only with non-hazardous solid waste generated at NPS facilities. Solid waste is defined as durable goods, non-durable goods, containers and packaging, food wastes, yard wastes, and miscellaneous inorganic wastes from residential areas, commercial and institutional operations, and public areas in a park.

Hazardous waste, as defined under the Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery Act of 1976, is dealt with under 40 CFR Part 261 and other NPS guidance on hazardous waste. These include the *NPS Hazardous Waste Management Handbook* and the *NPS Pollution Prevention and Community Right-to-Know Training Manual*.

Liability associated with the release of hazardous substances into the environment pursuant to the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA), 42 U.S.C. Section 9601 et seq., is also not addressed in this handbook. Information regarding CERCLA is available from other USEPA and NPS sources, including the 1994 *NPS CERCLA Guidance Manual*.

Finally, this handbook does not provide rudimentary information on how to start a recycling program. Parks requiring information on this issue should refer to the *NPS Recycling Handbook for Recreational Areas*, developed by Dow Chemical in conjunction with the NPS. The booklet documents the programs that Dow and Huntsman Chemical Companies sponsored at seven national parks around the country. It also provides basic information on how to start a recycling program.

All of these documents are available from PFMD/WASO at (202) 343-7040 or from the park's System Support Office solid waste management coordinator.

Who Should Use This Handbook

Solid waste management responsibilities now extend far beyond their typical home in a park's maintenance unit. Concessions management officials, interpretive specialists, and procurement officers all have solid waste responsibilities in parks that have developed ISWAP plans. This handbook is therefore designed to serve the needs of all employees who are in some way involved in the management of a park's solid waste program.

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Chapter II: **ISWAP Goals**

Background

When the NPS created ISWAP in 1991, it did not establish formal performance goals, but generally encouraged parks to reduce solid waste generation and maximize recycling efforts. In 1993, Executive Order 12873 (*Federal Acquisition, Recycling and Waste Prevention*) stiffened these requirements. In Section 601 of that order, the NPS and other federal agencies were required to "establish a goal for solid waste prevention and a goal for recycling."

To comply with that mandate, the NPS has established three goals that each park is required to pursue:

- Goal #1:** By September 30, 1998, develop a formal ISWAP plan.
- Goal #2:** By the year 2000, achieve a 5% decrease in total solid waste levels (including both trash and recyclables) from the amount generated in the park in 1997.
- Goal #3:** By the year 2000, recycle and/or compost at least 40% of all waste materials generated in the park that year, and each year thereafter. In states where the recycling and/or composting rate¹ has been set at a level higher than 40%, the higher rate shall be used as the park's goal.

Explanation of Goals

An ISWAP plan represents the culmination of an analysis of how a park can manage its entire solid waste stream more efficiently. Parks with ISWAP plans have found the analysis to be worthwhile, and use the plan as a roadmap for future actions. An ISWAP plan is a fundamental need if a park is to meet the waste reduction and recycling/composting goals cited above.

The ISWAP performance goals are set at levels that are achievable, but not without some effort. Looking at the waste stream of most parks, a sizable percentage of the material is recyclable, compostable, or preventable. Most parks, however, currently divert far less than

¹In some areas this figure is known as the "diversion rate," and refers to the amount of material diverted from the waste stream into a composting or recycling program.

the amount required by the new goals, and realistically should plan to develop their programs over time, rather than trying to achieve the targets immediately.

Compared to goals set by other federal agencies, the NPS goals are generally on the high end of the scale, reflecting NPS leadership on environmental stewardship issues. The NPS was founded on the principle of maintaining the integrity of the natural environment, and individual parks can help uphold this legacy by continuing to strive for improvement in their solid waste program, regardless of their current performance level.

Calculating Compliance with These Goals

Calculating the 5% waste prevention goal is a relatively straightforward process. Using fiscal year or calendar year 1997 solid waste tonnage information as the baseline, parks should subtract 5% of this value to obtain the year 2000 goal. Parks undergoing a significant change in visitation or some other aspect of their operation during that period should measure waste generation on a pound per visitor basis. Calculating waste generation per visitor allows the park to adjust for both increased waste generation (due to increased visitation) and reductions attributable to waste prevention measures. Per capita measurements have value, however, only at facilities whose visitation figures accurately represent the public's use of the park.

Compliance toward the 40% diversion goal can be calculated using the following worksheet. A blank copy of the worksheet is attached as Appendix C.

Because special waste materials, such as used oil, tires, and wooden pallets are often not measured in the same units as other recyclables, they should be excluded from this diversion calculation. However, to ensure that the park receives credit for diverting these materials, they should be reported as "Other Special Wastes Recovered by the Park" in any report to the System Support Office or PFMD/WASO. (For a complete discussion of special waste materials, see Chapter 9.)

ISWAP Waste Diversion Worksheet

(all figures in pounds)

Name of Facility:

XYZ Park

12 mo. period covered:

1/97 - 12/97

| Type of Waste Material | Amount of Material Collected by Private Contractor | | Amount of Material Collected by NPS Crews | | Total Recyclables | Total Trash |
|----------------------------------------------------|----------------------------------------------------|---|-------------------------------------------|---|-------------------|-------------|
| Trash | | + | 296,000 | = | | 296,000 |
| Recycled -- metals | | + | 6,300 | = | 6,300 | |
| Recycled -- plastics | | + | 1,600 | = | 1,600 | |
| Recycled -- glass | | + | 5,600 | = | 5,600 | |
| Recycled -- paper & cardboard | | + | 3,200 | = | 3,200 | |
| Composted/chipped -- yard waste/ tree limbs/ grass | | + | 36,000 | = | 36,000 | |
| Composted -- manure | 56,000 | + | | = | 56,000 | |
| Composted -- food waste | | + | | = | | |
| Composted -- sewage/sludge | | + | | = | | |

Total =

Total
Recyclables

A 108,700

Total
Trash

B 296,000

Waste diversion formula =

$$\frac{\text{Box A (Total Recyclables)}}{[\text{Box A (Total Recyclables)} + \text{Box B (Total Trash)}]}$$

Total waste diversion

= 26.9 %

List Other Special Wastes Recovered by the Park: (Note: Do not use them in above calculations)

Oil (168 gallons)

Tires (24)

Reporting Requirements

Parks should report compliance with these goals to their System Support Office, but overall agency compliance will be monitored by PFMD/WASO. This data will then be compiled and shared with the Department of the Interior's Office of Environmental Policy and Compliance. Monitoring compliance with these goals will commence in Fiscal Year 1997. Forms similar to the worksheet above will be developed for park use to facilitate reporting on the numerical goals.

Parks seeking information on what should be included in an ISWAP plan should refer to Appendix D, which summarizes the recommended contents. Parks requiring assistance in developing their ISWAP plan should contact their System Support Office or PFMD/WASO at (202) 343-7040.

Chapter III: Waste Generation and Composition

Waste Generation

Accurate information on the quantity of solid waste a park generates annually is important for forming a baseline against which other solid waste management options can be measured. Such information is also necessary for monitoring progress in waste reduction, as called for under the new ISWAP goals. Unfortunately, few park units have accurate estimates of such generation, particularly where solid waste collection and hauling are contracted out. In some cases, contract costs are independent of the quantity of waste disposed, so tonnage or volume figures are not provided to the park. Other parks are only one of a long list of stops made by a contractor, and isolating the amount of waste actually attributable to the park is difficult.

Parks can develop waste generation estimates in a number of ways. Following is a brief overview of some techniques, along with their pros and cons. (See also Appendix E, which lists weight estimates for different materials based on the size of the container.)

Table 1
Estimating Waste Generation Within Parks

| Technique | Pro | Con |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Rely on contractor estimates | <ul style="list-style-type: none"> – easiest method for park | <ul style="list-style-type: none"> – of questionable accuracy, unless contractors have an on-board scale <u>or</u> pick up only park-generated waste before dumping at the disposal facility |
| 2) Rely on weight tickets from disposal facility | <ul style="list-style-type: none"> – A very accurate measure if NPS crews handle all collection | <ul style="list-style-type: none"> – many parks contract out collection, and park-generated material may be only a portion of the load weighed on the scale |
| 3) Calculate how full each dumpster or can is, and apply average weight/container estimates to these calculations | <ul style="list-style-type: none"> – reasonably accurate, fairly easy for the park to develop these calculations – can be used regardless of whether NPS crews empty the container or not | <ul style="list-style-type: none"> – seasonal variations in “fullness” may skew estimates – locational or seasonal variations in material types may skew estimates |
| 4) Apply average weight estimates to each bag or container emptied (as reported on the MMP computerized tracking system) | <ul style="list-style-type: none"> – reasonably accurate, fairly easy to calculate | <ul style="list-style-type: none"> – applicable only if NPS crews empty the containers and this information is tracked on the MMP |
| 5) Use average pounds/visitor estimates developed by other parks: Grand Canyon = 1.81 lbs/visitor Prince William Forest = 2.54 lbs/visitor Yosemite = 2.7 lbs/visitor | <ul style="list-style-type: none"> – very simple approach | <ul style="list-style-type: none"> – valid only if park has accurate visitation estimates. – parks often have different visitation patterns or operating circumstances (e.g. campsites, concessions operations, etc.) |

Parks should try estimating total solid waste tonnage using a variety of these methods -- the closer the different estimates, the greater the likelihood of accuracy.

The box below reflects one park's attempt to calculate total waste generation.

Sample Waste Generation Calculation:
Sleeping Bear Dunes National Lakeshore

As part of its effort to implement a new recycling program in the park, Sleeping Bear Dunes needed to calculate the total amount of solid waste generated annually. Tonnage figures provided by the hauler were considered unreliable, so the park tried using four other approaches.

- 1) Use lbs/visitor estimates from other parks

$$1.3 \text{ million visitors} \times 2 \text{ lbs/visitor} \div 2,000 \text{ lbs} = 1,300 \text{ tons}$$

- 2) Base it on the dumpster pickup schedule:

$$[35 \text{ dumpsters} \times 3 \text{ yd}^3/\text{dumpster (size of dumpster)} \times 2/3 \text{ full (average dumpster volume)} \times 12 \text{ weeks (peak season)} \times 2 \text{ pickups/week}] + [35 \text{ dumpsters} \times 3 \text{ yd}^3/\text{dumpster} \times 2/3 \text{ full (average dumpster volume)} \times 40 \text{ weeks (shoulder \& off season)} \times 1 \text{ pickup/week}]$$

$$\text{Equals: } 4,480 \text{ yds}^3 \times 250 \text{ lbs/yd}^3 \text{ (average conversion factor for trash)} = 560 \text{ tons}$$

- 3) Base it on collection contract (I)

\$16,000 collection contract @ \$14/dumpster (price quoted in contract) so in one year there are 1,142 pickups. Assuming the dumpsters are 2/3 full, this

$$\text{Equals: } 1,142 \text{ pickups} \times 3 \text{ yds}^3/\text{dumpster} \times 2/3 \text{ full} = 2,285 \text{ yds}^3 \times 250 \text{ lbs/yd}^3 = 285 \text{ tons}$$

- 4) Base it on collection contract (II)

The park pays \$16,000/year for collection and disposal. If ALL of this went for disposal, (an impossible assumption because it means the hauler doesn't cover any collection costs), the maximum possible tonnage level can be identified. Since the cost of disposal = \$6.75 yd³, $(\$16,000/\$6.75/\text{yd}^3) = 2,370 \text{ yd}^3 \times 250 \text{ lbs/yd}^3 = 296 \text{ tons}$. This is the maximum possible tonnage that can be generated in the park.

Conclusion: Since Method #4 gives the maximum possible level of waste generation in the park, methods 1 and 2 cannot be accurate. Moreover, since methods 3 and 4 produce similar answers, 285-296 tons is probably a reasonable estimate.

Waste Composition

In an integrated approach to solid waste management, each material has a preferred management strategy and other less preferred management options. The preferred management strategy is a function of the material's characteristics (density, etc.) and other factors (market prices, etc.). For example, in many communities, the preferred management strategy for newspaper is to recycle it and the less preferred strategy is to landfill it. Other communities may prefer composting and then landfilling. Waste composition (or waste stream analysis) estimates allow the planner to develop material-specific management policies based on economics, park preferences, available staff resources, and other factors.

Preferred management strategies are also based on the size of the waste stream. Because collecting small quantities of materials or materials that are of low density (such as plastic) is extremely expensive, waste composition data play a key role in identifying the "least cost" approach to solid waste management. Knowledge about the quantities of each material, and where it is generated around a park, allows planners to compare the costs of different management strategies.

Relatively few park units have conducted comprehensive waste composition studies, though the following three studies conducted in the last few years are notable.

Yosemite National Park conducted two waste characterization studies in 1991. These studies examined waste originating in campgrounds and housing areas, and included only disposed (not recycled) waste. Because of this methodology, these studies are likely to have underestimated materials recycled at significant rates within Yosemite.

Yellowstone National Park conducted a parkwide waste characterization study in 1992. Unlike the Yosemite analysis, this study included materials that were recycled, resulting in a better approximation of total waste composition in the park.

A third relevant study was undertaken at Jasper National Park in Canada in 1991 and 1992. It is likely that this study also undercounted certain recyclable materials collected in the campgrounds, including paper, glass, and metals.

On their own, none of these studies are ideal representations of the waste composition of the "average" park. Each national park has its own unique visitation characteristics, and visitor service levels vary widely. Some parks have campgrounds, picnic areas, and concessioners that generate a large variety of solid waste. Others primarily generate office paper.

Table 2
National Park Waste Composition Studies
 (% of disposed waste from each area, by weight)

| Material | Yosemite (campgrounds) | Yosemite (housing areas) | Yellowstone (all areas) | Jasper (Canada) (campgrounds) |
|----------------------|---------------------------|-----------------------------|----------------------------|-------------------------------------|
| Paper | 22% | 26% | 29.0% | 22.3% |
| Mixed paper | 14% | 17% | 7.2% | 14.6% |
| Newspaper | 2% | 2% | 4.1% | n/a |
| Corrugated cardboard | 6% | 7% | 16.1% | 7.7% |
| Other | n/a | n/a | 1.7% | n/a |
| Plastic | 8% | 7% | 6.6% | 7.2% |
| PET | <1% | <1% | 0.2% | n/a |
| LDPE | 2% | 1% | n/a | n/a |
| HDPE | 1% | 1% | 0.6% | n/a |
| Other | 5% | 5% | 5.8% | n/a |
| Metal | 8% | 4% | 5.2% | 6.6% |
| Ferrous | 5% | 4% | 1.9% | 4.1% |
| Aluminum | 3% | <1% | 1.8% | 2.5% |
| Misc. | n/a | n/a | 1.5% | n/a |
| Other inorganics | 13% | 2% | n/a | Ash = 28.0% |
| Glass | 13% | 7% | 8.7% | 12.4% |
| Wood | <1% | 12% | n/a | n/a |
| Food waste | 25% | 11% | 36.9% | 11.9% |
| Other organics | 4% | 13% | n/a | 4.2% |
| Yard waste | <1% | 7% | n/a | 6.7% |
| Misc. | 6% | 10% | 13.5% | <1% |

Note: Numbers may not add to 100% due to rounding.

Parks interested in estimating waste composition can do so in two ways. First, they can conduct their own waste composition study. The EPA *Business Guide for Reducing Solid Waste* contains information on how to do this (see Worksheet D of the guide). A copy of the guide can be obtained by contacting the RCRA Hotline at (800) 424-9346 and asking for

document 530-K-92-004. Parks can also hire a local waste hauler or consultant to conduct such a study. If selecting this option, be sure the contractor has prior experience conducting these studies and knows how to conduct a statistically representative analysis.

Parks can also develop "composite" estimates based on data derived from other sources. Table 3 includes waste composition information for five different "sectors" commonly found in parks. Used in conjunction with campground or residential area data from the three park studies shown in Table 2, parks can calculate composite waste composition figures for their own facility. Complete instructions on how to develop such composite estimates are provided in the box on the next page.

Table 3
Sector-Specific Waste Composition Data

| | | Grocery Stores | | Other Retail | | Hotels | | Food Service | | Offices | |
|----------------|----------------------|----------------|-------|--------------|-------|--------|-------|--------------|-------|---------|-------|
| Paper | Corrugated cardboard | 14.6% | 6.8% | 50.0% | 19.9% | 35.9% | 8.9% | 32.5% | 16.3% | 74.8% | 3.9% |
| | Newspaper | | 1.1% | | 3.9% | | 11.7% | | 4.8% | | 10.0% |
| | Office paper | | 0.1% | | 1.7% | | 1.2% | | 0.0% | | 25.8% |
| | Mixed paper | | 6.5% | | 24.4% | | 14.2% | | 11.4% | | 35.1% |
| Plastic | PET | 9.6% | 0.0% | 14.1% | 0.1% | 7.5% | 0.6% | 7.0% | 0.0% | 6.6% | 0.1% |
| | HDPE | | 0.2% | | 0.7% | | 0.6% | | 3.6% | | 0.4% |
| | Film plastics | | 5.2% | | 7.4% | | 3.4% | | 2.7% | | 2.3% |
| | Polystyrene | | 3.9% | | 2.8% | | 0.9% | | 0.3% | | 1.9% |
| | Other | | 0.4% | | 3.0% | | 2.1% | | 0.5% | | 1.9% |
| Glass | Containers | 1.6% | 1.1% | 7.1% | 2.8% | 5.4% | 5.4% | 4.4% | 4.4% | 2.4% | 2.2% |
| | Other glass | | 0.5% | | 4.3% | | n/a | | 0.1% | | 0.2% |
| Metals | All types | 0.8% | 0.8% | 4.6% | 4.6% | 4.6% | 4.6% | 2.7% | 2.7% | 2.3% | 2.3% |
| Yard waste | Leaves/grass | 1.2% | 0.9% | n/a | n/a | 5.6% | n/a | 0.6% | 0.6% | 1.3% | 1.3% |
| | Trees/brush | | 0.3% | | n/a | | 5.6% | | | | |
| Other organics | Food waste | 71.3% | 61.3% | 21.7% | 6.1% | 31.4% | 17.3% | 52.3% | 45.4% | 12.2% | 10.6% |
| | Wood waste | | 7.1% | | 9.0% | | 3.3% | | 0.2% | | 0.2% |
| | Misc. | | 2.8% | | 6.6% | | 10.9% | | 6.8% | | 1.4% |
| Other waste | All types | 1.0% | 1.0% | 2.6% | 2.6% | 9.5% | 9.5% | 0.5% | 0.5% | 0.4% | 0.4% |

Note: Numbers may not add up due to rounding.

Developing a Park Waste Composition Estimate: The "Composite" Approach

In 1994, a team of consultants conducted an analysis of solid waste options for Grand Canyon National Park. No refuse sorting was done to characterize the composition of the material generated in the park. Instead, a "composite" estimate was developed, using published data of different waste generators similar to some aspect of Grand Canyon's operation. Presented below is an example of this methodology, using data derived from a generic park.

Example -- Assume there are three primary waste generators in this park: NPS administrative offices are responsible for 20% of the park's waste, the campground generates 50%, and the snack bar generates roughly 30%. Assume the park generates 80 tons of trash per year. Using estimates found in the tables in this chapter, a weighted waste composition estimate for the park is developed in the following manner:

| | NPS Administrative Offices (20% of waste stream = 16.0 tons) | | Campground (50% of waste stream = 40.0 tons) | | Snack Bar (30% of waste stream = 24.0 tons) | | Composite Parkwide Tonnage Estimate | Composite Parkwide Percentage Estimate |
|-------------|-----------------------------------------------------------------------|-----------|----------------------------------------------------|-----------|---------------------------------------------------|-----------|----------------------------------------------|-------------------------------------------------|
| | % | x 16 tons | % | x 40 tons | % | x 24 tons | | |
| Paper | 74.8% | 12.0 | 22.0% | 8.8 | 32.5% | 7.8 | 28.6 | 35.7% |
| Plastic | 6.6% | 1.1 | 8.0% | 3.2 | 7.0% | 1.7 | 5.9 | 7.4% |
| Glass | 2.4% | 0.4 | 13.0% | 5.2 | 4.4% | 1.1 | 6.6 | 8.3% |
| Metals | 2.3% | 0.4 | 8.0% | 3.2 | 2.7% | 0.6 | 4.2 | 5.3% |
| Organics | 13.5% | 2.2 | 30.0% | 12.0 | 52.9% | 12.7 | 26.9 | 33.6% |
| Other waste | 0.4% | 0.1 | 19.0% | 7.6 | 0.5% | 0.1 | 7.7 | 9.7% |

Note: The waste stream composition estimates for each sector are derived from different sources. The NPS administrative office figures are estimated from "standard" office waste composition estimates found in Table 3, as are the snack bar estimates. Campground estimates are derived from the waste composition study performed at Yosemite.

Step 1: Multiply the fraction of the total waste stream created by each generator by the total tonnage in the park.

Example: Administrative offices generate 20% of the waste stream = $20\% \times 80 \text{ tons} = 16 \text{ tons}$

Step 2: Multiply the tonnage estimate for that fraction of the waste stream by the waste composition data relied on for that sector.

Example: The Yosemite waste composition study found that 22% of the waste stream in campgrounds is paper. Using that figure and the campground tonnage estimate, paper from campgrounds represents approximately 8.8 tons of material at this park. Continue making these calculations until tonnage estimates are calculated for all the different materials.

Step 3: Develop a composite tonnage estimate by adding together the tonnage estimates for each of the different sectors in the park. Then calculate the fraction of the total waste stream each material composes.

Example: Using glass as an example, it is estimated that 0.4 tons are generated in NPS offices, 5.2 tons in campgrounds, and 1.1 tons in the snack bar area. These total 6.6 tons of glass in the park, which represents 8.3% of the 80 tons generated annually.

Visitation Trends and Forecasts

Visitation levels have increased dramatically throughout the NPS in the past two decades. Many explanations have been offered for this trend, including the maturing of the baby-boom generation and increasing foreign visitation. Long-range solid waste plans for a national park must consider future visitation levels, since they can dramatically effect a park's options; technologies or strategies that are currently too large or costly may become cost-effective later.

Most parks have some type of visitation forecast included as part of their general management plan. A park may also have commissioned studies as part of other research conducted for transportation or concessions management purposes. If most visitors come from the region immediately surrounding the park, consider using local population forecasts as a proxy for future visitation levels.

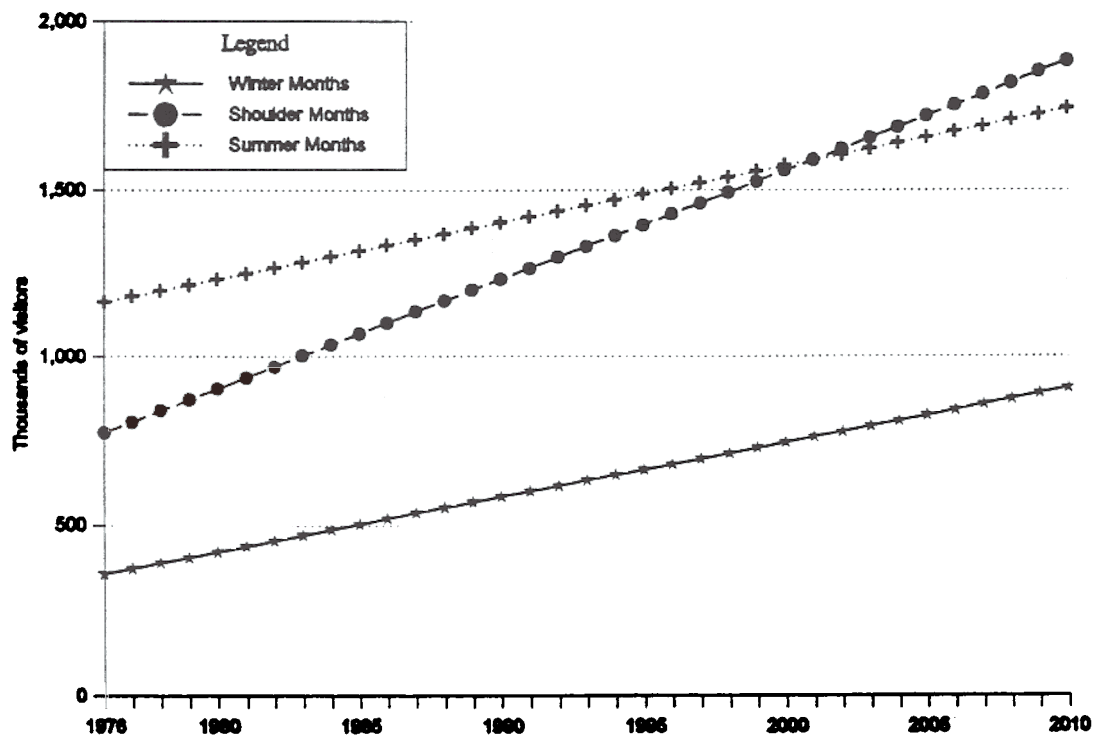
One recent study stands out in showing how increases in visitation can affect solid waste management decision-making. In 1992, the California State University Institute for Social Research conducted an evaluation of past and future visitation trends in Yosemite National Park. The study found that visitation would continue to grow rapidly, and that much of it would come during the "shoulder" (spring and fall) seasons.² Figure 1 (next page) shows the rates for both shoulder and peak season visitation.

This was important information for the park. Increased shoulder season visitation would probably have little impact on overall solid waste system requirements, except perhaps creating a longer season for employees. If the figures had shown increased peak season visitation, however, the park would have to plan for additional overtime expenses, greater vehicle wear and tear, slower collection times due to congestion, and other factors that increase per unit collection and disposal costs.

Parks may wish to consult the Denver Service Center (DSC) when developing visitation forecasts. The DSC has prepared forecasts for a number of parks and can be helpful in identifying key factors affecting a park's visitation.

²According to NPS visitation data, this trend is true service-wide. (1994 NPS Statistical Abstract, page 22).

Figure 1
Seasonal Visitation Trends
Yosemite National Park



Source: California State University Institute for Social Research

Chapter Summary: Waste Generation and Composition

Waste generation and composition information are important elements of a solid waste program analysis. Waste generation information allows the park to calculate the per ton cost of its solid waste management program, an important factor when comparing alternatives. Waste composition information is also vital to determining whether (and how) specific materials should be collected in the park. Understanding how both of these factors may change over time is useful, because options that currently are too expensive may become cost-effective in the future.

Key concepts:

- Average waste generation per visitor varies with length of stay and other factors, such as whether the park has campgrounds or concessions operations. At three national parks, the figure varies from 1.8 lbs/visitor to 2.7 lbs/visitor.
- Only a few parks have conducted comprehensive waste composition studies. Their waste composition estimates (or other standard industry waste composition estimates) may be a good starting point for parks lacking any other information.
- Visitation forecasts are useful in projecting changes in a park's solid waste stream. This information is important because it helps determine the scale of a collection and recycling program, as well as predicting future staffing and/or equipment needs.

Chapter IV: **Source Reduction and Reuse**

Background

When the U.S. Environmental Protection Agency (EPA) established a solid waste management hierarchy in 1989, it placed source reduction and reuse at the very top of the list. This was a logical decision, because compared with other elements of the hierarchy, which focus on managing wastes that already exist, source reduction and reuse focus on preventing waste generation.

Generating less waste can have obvious cost-saving benefits for parks. First, many trash bills are based on the weight or volume of the material generated and how frequently it is collected. Generating less trash means one or both of these factors should decline, as should park costs.

Second, source reduction often involves a decrease in the amount of materials purchased. For instance, if the park can convince visitors to return maps to the visitor center, fewer maps must be purchased.

Using less material and generating less waste also provides benefits outside the park. This is particularly true at the location where the item is produced or where raw materials used for manufacturing are mined or processed. Although these so-called "upstream" benefits are often difficult to quantify, from an environmental perspective they are no less important than the benefits accrued directly by the park.

Definitions

Source reduction (also known as waste prevention) involves reducing the overall amount or toxicity of materials produced, consumed, or disposed of in a park.

Reuse involves taking something out of the waste stream and using it again. Materials can be reused in two ways: for the same purpose (such as a ceramic coffee mug), or for a new purpose (such as using an old tire as a bumper on a boat dock).

Identifying Source Reduction and Reuse Opportunities

Many opportunities for source reduction and reuse exist within parks. Often, park managers can identify them based on the amount of materials used. A lot of brochures distributed at the visitor center, for instance, may point out the need to investigate non-paper based strategies to communicate with park visitors.

Another way to identify source reduction opportunities is to focus on the waste generated by the park. For instance, a ranger leading nighttime nature walks may regularly use a lot of flashlight batteries. Purchasing rechargeable batteries can therefore make both economic and environmental sense.³

When identifying source reduction opportunities by focusing on waste, remember to consider what is in the recycling bin. Although recycling is better than disposal, it is even better not to generate the recyclable material at all.

Most park units will find it easiest to identify source reduction opportunities by focusing on discrete waste generating sources. These include:

- waste generated by visitors (includes material collected from parking lots, campgrounds, picnic areas, trailheads, and other public areas)
- waste generated by NPS personnel (includes waste from NPS offices, maintenance yard, etc.)
- waste generated at NPS or concessioner staff housing areas
- waste generated at concessions operations (includes hotels, food service, retail stores, etc.)

Specific strategies for achieving source reduction in each of these areas are found below. Parks with limited resources should determine which of these sources generate the most waste in the park, and prioritize waste prevention efforts accordingly. It is important, however, to keep in mind that the biggest generator may be the most difficult to rehabilitate. Parks with cooperative concessioners or small employee housing areas may want to start with these areas and work up to a more difficult one.

Source Reduction and Reuse Strategies -- Visitor-generated waste

Few visitors enter a park having planned ahead to reduce their waste generation while in the park. In fact, most visitors generally plan for convenience, which often translates into excess packaging, small size containers, and other practices that work against waste prevention principles.

A first step toward reducing visitor generated waste is to reach out to visitors *before* they ever get to the park. Opportunities include:

³Some parks have rules against the use of rechargeable batteries by rangers. Carlsbad Caverns National Park, for instance, has a no-rechargeables policy on ranger-led tours because of the safety risk to visitors if the batteries should fail.

Incorporating information on the park's solid waste problem as part of the packet sent to visitors requesting information before their trip. Tips on how to be a "waste-wise" visitor can be included.

Including source reduction tips with campground, group picnic, and hotel reservation confirmation forms. (For example, encouraging picnickers to bring food in reusable containers.)

Contacting companies and travel agents who run tours to the park and requesting that they provide customers with information on how to be a waste-wise visitor. You can also encourage those that provide meals to distribute "litter-less" lunches to customers.

Posting information at local businesses where visitors buy supplies before entering the park.

Another strategy for limiting visitor-generated waste is to take steps that rely not on the visitor's knowledge of waste prevention techniques, but on initiatives that physically limit their opportunity to use materials and/or generate waste once in the park. For instance, most parks rely on brochures and other paper-based approaches to educate visitors about park resources. A source reduction-based education strategy would rely instead on signs, tape-recorded messages, videos, or computer systems that visitors can easily access.

Source Reduction and Reuse Strategies -- NPS Operations

When it comes to source reduction, the NPS must lead by example. Concessioners may balk at implementing source reduction and recycling programs if they notice poor waste management practices by the park. Similarly, if visitors enter NPS offices and find wasteful practices they will not respond well to exhortations to be waste-wise visitors.

The NPS is making system-wide strides in the area of source reduction. CC:mail, the computerized electronic mail system, is one of the best examples. On a daily basis, employees transmit memos and messages back and forth without using paper. Photocopiers with double-sided copying ("duplex") capability and double-sided laser printers are other good technological approaches to source reduction.

Source reduction opportunities exist outside the headquarters office as well. Maintenance managers excel at finding new uses for discarded materials, and unwanted equipment or materials can be donated to another park or community organization.

Electronic newsletters are good vehicles for advertising the availability of these items. The CC:mail Maintenance and Ranger Activity Bulletin Boards are useful resources for sharing source reduction and recycling information.

It is up to park managers to make source reduction efforts a priority among employees.

Office Paper Waste Reduction Tips

- Create double-sided and single-spaced documents
- Use narrow margins to avoid pages with little text
- Edit and proofread on the computer before printing
- Load laser printer trays with paper already used on one side for printing drafts and internal memos
- Circulate/share documents, publications, and telephone books
- Post office announcements on bulletin boards
- Set up central filing systems
- Store files on computer disks
- Use small pieces of paper for short memos
- Use scrap paper for drafts and notes
- Eliminate fax cover sheets
- Increase use of electronic mail

Source: INFORM, Inc.

Long-term employees become ingrained in certain ways of doing things and sometimes need reminders to send memos electronically or printed on both sides of a page. In 1994, the Field Director of the National Capital Area issued a special directive requiring employees to "duplex copy all in-house documents and attachments and all attachments for documents leaving the (System Support Office and Field Director's Office)." A similar policy can easily be put into place at every park.

It is also important for procurement officers to understand the key role they play in helping the park reduce waste. By purchasing in bulk, or by working with vendors to identify alternative products with less packaging, they can help employees

perform their job with less waste by-products. Procurement officers also play a key role in helping parks implement the affirmative procurement guidelines called for under Executive Order 12873. Complete information on those requirements (along with other affirmative procurement tips) is found in Chapter 12.

Source Reduction and Reuse Strategies -- Employee Residences

Parks developing ISWAP plans should not overlook the waste generated in employee housing areas. The following initiatives can help minimize solid waste in those areas:

Subsidize the purchase of backyard and worm composting bins, and provide training programs that show staff how easy it is to compost food and yard waste. (If the park has a problem with animals scavenging through waste bins, it can limit these programs to yard waste only.)

Establish "Smart Shopper" campaigns that educate employees about how to shop with source reduction principles in mind (e.g., buy in bulk, buy products with minimal packaging, etc.) The "tool kit" listed in the box on the next page contains education materials that can easily be adapted for use in any park.

Establish a junk mail campaign to reduce unwanted catalogs and other mailings. In parks with frequent staff turnover, this may be a particularly important initiative, because many

companies continue to send catalogs and brochures to "John/Jane Doe or current resident" long after the intended recipient has left the park. Asking employees moving out of the park to complete a postcard addressed to the Mail Preference Service at the Direct Marketing Association (see box on this page) can help stem this flow.

Encourage staff to share equipment that they need infrequently (hedge trimmers, etc.) Encourage them to repair and reuse other items.

Once the park has chosen the initiatives it wants to pursue, it must decide how to present this information to employees. Employee orientation is the best place to start for new employees, as it communicates the message that these are important issues in the park. Follow-up articles in employee newsletters and brief discussions at staff meetings all reinforce this point. If employees show enough interest, bring in local companies or municipal officials to discuss recycling and source reduction issues at a brown bag lunch. Because employee turnover is high in many parks, these efforts should be scheduled a few times each year.

A more ambitious strategy involves approaching local officials and businesses in the communities near the park about collaborating on an area-wide source reduction campaign. Residents of these areas are often frequent park visitors, and are thus important people to target in waste reduction efforts. Similarly, the more local businesses serving park visitors understand the role they play in affecting the amount of waste visitors generate, the more the park will benefit. The EPA WasteWiSe program (1-800-EPA-WISE) has information on how businesses can establish their own source reduction programs.

Source Reduction Resources for Employee Housing Areas

"Shop S.M.A.R.T. Education Tool Kit"

Contains information on "environmental shopping." Includes a short video, camera-ready copy for brochures, etc. Price = \$15. Contact Cornell University Waste Management Institute @ 607-255-2080.

Junk mail -- Tell employees to contact the following organization and have their names placed on the "delete file." They should mention any variations in their name that show up on their junk mail.

Mail Preference Service
Direct Marketing Association
P.O. Box 9008
Farmingdale, NY 11735

Employees can also contact magazines, catalogs, and associations directly, requesting that their name and address not be "rented" or sold for marketing purposes.

**Yosemite National Park
Concessioner Solid Waste Requirements**

A) Source Reduction

The Concessioner will implement a source reduction program designed to minimize its use of disposable products in its operations. Reusable and recyclable products are preferred over "throwaways." Polystyrene and plastics will be used as little as possible, and then only polystyrene not containing chlorofluorocarbons. Where disposable products are needed, products will be used which have the least impact on the environment. The use of post consumer recycled products whenever possible is encouraged.

B) Recycling and Beverage Container Programs

The Concessioner shall participate fully in the California beverage container redemption/recycling program. The Concessioner shall implement a recycling program which fully supports the efforts of the Service. Products to be recycled include but are not limited to paper, newsprint, cardboard, bimetals, plastics, aluminum, glass, waste oil, and antifreeze. The Concessioner shall provide access to and use of recycling programs to the Service and its cooperators.

Any beverage container deposits collected in excess of related operating expenses will be used for environmental projects as approved in writing by the Superintendent. An accounting of the beverage container deposits collected and distributed will be provided to the Service on an annual basis.

Source: Yosemite National Park Operating Plan
Section XVI Recycling and Conservation
page 46-47

**Source Reduction and Reuse
Strategies -- Concessions**

Concessions operations within parks undoubtedly play a major role in determining how much waste the park must manage. Much of the waste in public areas comes from items purchased from or given away by the concessioner. For instance, a visitor may purchase a bag lunch from a snack bar to enjoy while hiking or biking in the park. Once they have enjoyed the food, however, the sandwich wrappers, straws, napkins, and empty ketchup packets frequently go into a trash can or dumpster that the park pays to maintain. Thus, decisions made by the concessioner about product packaging are important.

Some parks have been very successful in regulating concessioner operations to reduce overall or specific types of waste generation. In the late 1970s, Yosemite National Park banned the use of expanded polystyrene (styrofoam) in cups, plates, and food containers at food service operations. This requirement was built into the Maintenance Agreement/Operating Plan negotiated annually with concessioners, as shown in the box on this page. Other parks have banned straws (as a litter prevention measure) or sales of drinks in glass containers (for safety reasons).

Concessions contracts are another good place to build in these requirements. When designing the bid documents for a new concessions contract in Yosemite, the park incorporated language requiring the new concessioner to continue or expand on the previous concessioner's solid waste recycling and source reduction efforts.

New rules restricting the creation of new solid waste disposal sites in national parks have enhanced parks' leverage on this issue. NPS "concessioners, commercial use licensees, and contractors [are required to] comply with acquisition, recycling and waste minimization goals established by the NPS."⁴ Although the concessioner's obligations are quite clear under this rule, how a park goes about achieving compliance is not. Parks have a great deal of latitude in developing requirements appropriate to their concessions operation.

Specific Concessioner Source Reduction and Reuse Strategies

The range of concessions activities throughout the NPS makes it difficult to compile a comprehensive list of every possible source reduction strategy. Following are a few ideas and other resources that can help concessioners set up a source reduction program. Additional information is listed in Appendix B.

General Operations

- Require concessioners to develop waste prevention plans and report annually to the NPS on their progress toward meeting the goals they set.
- Consider waste reduction/disposal proposals in evaluating offers for new or renewed concession authorizations.
- Give preference to building renovations rather than new construction. Set recycled content requirements for construction materials, water and energy conservation guidelines, and xeriscaping (water-conserving landscaping) requirements.
- Encourage concessioners to retrofit buildings to use energy-efficient lighting and heating/cooling systems. Many local utilities offer rebates or assist in retrofit projects, resulting in both short- and long-term cost savings to the concessioner.

Food Service Operations

- Discourage the distribution of straws, which are a frequent litter problem.
- Allow concessioners to sell only drinks in containers that are compatible with the park's recycling program. (This generally means restricting sales to glass and aluminum and steel cans. If the park recycles polystyrene or other types of plastic, then it may allow them to use polystyrene or other types of plastic cups.)
- Encourage concessioners to give discounts to customers who bring their own cups. (The park may need to accommodate vendors by allowing them to restrict discounts to customers who purchase reusable cups from them.)
- Ban the use of single-serving condiment dispensers and require bulk dispensers instead. (The park may need the approval of the park sanitarian or the local health department for this, particularly at outdoor snack bars.)

⁴See *Solid Waste Sites in Units of the National Park System*, 36 FR Part 6 Section 6.8d (1995)

Require all food service facilities to use reusable plates, trays, cups, utensils, etc. wherever feasible.

Retail Operations

- Encourage stores to sell reusable shopping bags.
- Encourage stores to ask customers whether they want a bag, rather than automatically giving them one.
- Encourage stores to give discounts to customers who bring their own bags.
- Work with concessioners to identify overpackaged products on their shelves. Educate them about the link between what they sell and the waste generated in the park.

Hotel Operations

- Require hotels to establish a program whereby guests can request that the cleaning staff not change towels and linens for the duration of their stay.
- Encourage hotels to install refillable dispensers for shampoo, conditioner, and liquid body soap in each bathroom rather than providing individual soap bars or containers.
- Encourage hotels to establish a program under which used furniture, linens, towels, soaps, and shampoos are donated to area shelters.

Public Restrooms

- Encourage hotels to replace paper towel dispensers with warm air dryers or roll cloth towels.
- Encourage concessioners to purchase recycled content tissue for all restrooms in their facilities.

Chapter Summary: Source Reduction and Reuse

Source reduction, or waste prevention, involves reducing the amount or toxicity of materials used or disposed. Source reduction and reuse can provide both environmental and cost-saving benefits. Opportunities to reduce waste exist throughout the park.

Key concepts:

- Few visitors enter a park having given much thought to how they can reduce their waste generation while in the park. It is therefore up to each park to help educate visitors about this subject before they arrive.
- The NPS has made great strides in using technology to help reduce waste, but employees must be properly trained and encouraged to ensure that these technologies are used appropriately.
- The NPS can easily adapt education materials developed by environmental organizations and government agencies for its own use.
- Businesses around the country are saving money and preserving natural resources by implementing waste prevention practices. These practices can also be pursued by businesses operating in and near a national park.
- What parks buy, and how they buy it, can have big impacts on waste generation both in and outside the parks. Work with suppliers, employees, and purchasing staff to incorporate waste prevention principles into the purchasing process. Use the EPA's affirmative procurement guidelines to help direct the park's purchases of a wide variety of products.

Chapter V: **Recycling**

Background

Recycling is the most common waste diversion practice at NPS facilities. A recent survey found that 73% operated some type of recycling program. These facilities operate a wide range of programs, with some recycling only aluminum and others collecting and recycling four or more types of materials.

This chapter will discuss several parks' recycling programs and describe how recycling efforts can be designed or modified based on lessons learned by these facilities. This chapter will not describe the "ideal" program, since each program must be tailored to specific types of visitors, the local markets for recyclables, and the costs of alternative disposal of materials, such as landfilling, combustion, and composting.

Regulations Concerning Recycling at NPS Facilities

A variety of directives relate to recycling at NPS facilities:

- The Resource Conservation and Recovery Act (RCRA) directs federal agencies to comply with all federal, state, interstate, and local solid waste management and disposal requirements (RCRA Section 6001 [42 USC 6961]).

Staff Directive 82-2 (*Waste Management*) is the most directly applicable NPS guidance. It states that "...Separation, salvage, and recycling of recoverable materials will be accomplished to the maximum possible extent giving due consideration to the total effect on the environment and the economics of the energy expended versus energy or resources saved."

- Executive Order 12873 (*Federal Acquisition, Recycling, and Waste Prevention*) states that every agency "shall promote cost-effective waste prevention and recycling programs." Under the terms of the order, the NPS was required to develop performance goals (described in Chapter 2 of this handbook).

NPS 48 (*Concessions Guideline*) states that all beverage containers sold or offered for sale shall be sold in a returnable container. The intent of this guideline is to promote beverage container recycling.

36 CFR Part 6 (*Solid Waste Sites in Units of the National Park*), refers only to carbonated beverages, but requires the same management standards as NPS 48 does for all beverages.

40 CFR 244 (*Solid Waste Management Guidelines for Beverage Containers*) is the initial

document that prescribes management standards for carbonated beverages. Subpart 244.100(d) contains specific information regarding non-implementation exemptions and reporting requirements relative to the beverage container regulations.

Beverage Container Program Requirements

NPS Obligations

- All parks where beverages are sold in reusable or recyclable containers must require the concessioner or cooperating association to sell the beverages in returnable containers and maintain a refundable deposit system for such containers.
- Parks seeking an exemption from these requirements must complete a non-implementation report and submit it to the Concession Program Division at WASO. Exemptions may be applied for if: (1) the return program, if instituted, would require additional manpower or incur other costs which result in it losing money; (2) efforts to implement the requirements have failed to induce customers to buy beverages in returnable containers or to return them when empty; (3) it is impractical to establish refund locations in small remote outlets; or (4) there is no market for the recyclable container within a reasonable distance.

Concessioner Obligations

- A deposit of at least \$0.05 shall be imposed on all beverages sold in returnable/recyclable containers.
- The concessioner shall establish a system to redeem the deposit to customers as close to the point of sale wherever possible.
- Concessioners shall arrange for the reuse or recycling of all containers collected under the program.
- Customers must be informed about the existence of the program, and all containers must be clearly labeled.

Other Issues to Consider

- Parks seeking an exemption from the Beverage Container Program requirements are nonetheless encouraged to establish some type of waste prevention or recycling program for these containers.
- Refunds can be provided either through a staffed location or through "reverse vending machines."
- The redemption of containers for which a deposit was not collected may be a problem in parks where visitors often bring their own food and drinks.
- The park superintendent can allow the concessioner to keep unredeemed deposits for the purpose of covering the cost of this and other environmental programs in the park.

Source: NPS 48 and 40 CFR Part 244. For more information on these regulations, see Appendix G.

Designing Recycling Programs That Work in National Parks

When designing a recycling program, parks must consider the needs of the different groups of people who generate waste in the park. Unlike municipal recycling programs, national parks serve a changing set of people over the course of the year, including:

Visitors, including day visitors, campers, lodging visitors, etc.

Concessioners

Employees living outside the park

Employees residing in the park

NPS operations

Each of these groups produces a different type of waste material and may have different

interests or knowledge about recycling. Each park should determine the best program for each group, and then decide whether it should design a program serving the needs of most groups or of one specific group.

Successful programs also consider the efficiency and cost of collecting materials from different groups of people. Concessioners, for example, generate relatively high volumes of waste from single locations. Visitors, on the other hand, generate waste throughout a park. Because of this, the cost of collecting materials from the two groups will vary significantly.

Source Separated vs. Commingled Recycling

The diverse population served by recycling programs in national parks requires early consideration of program design. The most basic choice the manager must make is between source separated and commingled programs.

Commingled recycling programs collect materials from one or two containers. In many programs, newspaper and other paper products are collected separately, while all other recyclables are collected in one container. Materials are then sent to a processing facility for final sorting before they are sold to market.

In source separated programs, materials are separated at the point of collection. Separate containers are designated for each material, or in some cases for combinations of materials, such as all colors of glass. This type of program is frequently used in rural areas or at dropoff facilities. Doing the sorting up front saves on sorting costs by processing facilities; and if the materials are "clean" enough (i.e., there is minimal "contamination"), they can be sold directly to the appropriate markets.

Both types of programs can be found at NPS facilities around the country.

Table 4
Source Separated vs. Commingled Programs

| Program Type | Pro | Con |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Commingled | <ul style="list-style-type: none"> -- Easy for visitors -- Familiar for most people with curbside recycling at home -- Results in high volumes of collected materials | <ul style="list-style-type: none"> -- Requires sorting facility -- High levels of contamination |
| Source separated | <ul style="list-style-type: none"> -- Lower levels of contamination -- Low-cost program | <ul style="list-style-type: none"> -- May have lower participation rates -- Requires more containers or fewer locations |

Materials Commonly Recycled in National Parks

Aluminum -- The high concentration of aluminum in park waste streams provides an excellent opportunity for cost-effective recycling of this material. Aluminum markets exist around the country, and aluminum recyclers often provide storage and shipping containers for customers in remote locations. The high value of aluminum can generate significant revenues for recycling programs, and the material can be easily compacted using low-cost equipment. Aluminum recycling programs are generally made available to concessioners, employees, and park visitors.

Paper products -- Paper prices have increased substantially in recent years, as have the numbers of outlets for paper recycling and markets for paper products that previously were discarded. The collection of paper products varies from park to park: Cardboard is commonly recycled in larger park units, particularly those with large food and retail concessions operations. Most parks also have some form of office paper collection. White office paper is a high value item, though parks may need to separate it from other types of paper to receive the best price for it. Newspaper is collected only occasionally because it is not a significant component of park waste streams. Paper collection is generally offered only to employees and at concessions operations.

Glass -- Glass is another material commonly recycled at many national parks. The material has many recycling drawbacks, however: Since many parks are far from markets, transportation costs are significant because of the weight of glass. Second, processors often charge to accept glass, and collecting and recycling it can therefore be more expensive than discarding it. Finally, broken glass is a hazard and requires special care on the part of employees working with or near the material. Collection is generally offered to employees, visitors, and concessioners.

Plastics -- Several parks operate plastic recycling programs, typically collecting polyethylene terephthalate (PET, or #1 plastic), high density polyethylene (HDPE, or #2 plastic) and occasionally, polystyrene (PS, or #6 plastic). Markets for PET and HDPE have strengthened considerably over the past few years, and prices paid now tend to be good. However, collecting and recycling plastics present several challenges to park managers. Since these materials are lightweight and difficult to compact, collection vehicles may need to make frequent collections and storage locations must be regularly monitored. Collection costs may therefore far exceed the value received for any of the material.

Revenues from Recycling

The 1996 fiscal year budget authorization law (Treasury, Postal Service, and General

Government Appropriations Act, 1996, Pub. L. No. 104-52, § 608, 109 Stat 468, 1995) allows the NPS to "receive and use funds resulting from the sale of materials recovered through recycling or waste prevention programs." Such funds can be expended on compliance with "acquisition, waste reduction and prevention and recycling programs as described in Executive Order 12873 ... [and] other Federal agency environmental management programs, including ... hazardous waste management and pollution prevention programs."

Parks are therefore encouraged to structure their collection contracts or recyclable material marketing agreements so that they either directly receive revenue from the sale of the materials or use this revenue to reduce the cost of the contract.

Note: Because this language is found in an annual budget authorization, parks should check with PFMD/WASO each year to ensure this law is still in effect.

Recycling in the National Parks – Some Case Studies

This section profiles recycling programs in three national parks. Each park has a different program tailored to its particular group of users. In Wind Cave National Park, for example, employees and concessioners are provided opportunities to recycle a large number of materials. Visitors may recycle only glass, plastic, and aluminum. At Yosemite, visitors also have fewer recycling opportunities than employees and concessioners. At Prince William Forest Park, visitors and staff have equal recycling opportunities.

■ *Wind Cave National Park*

Wind Cave is located in rural South Dakota. Despite its remote location, the park has an innovative recycling program that it operates at very low cost. Materials recycled include aluminum, metal cans, plastics #1 and #2, all colors of glass, corrugated cardboard, newspaper, all office paper, flashlight batteries, and used motor oil. During the 1994 and 1995 fiscal years, the park recycled over 8 tons of material, or 26% of its total waste stream. Key elements of the park's successful program have been:

- Co-collection of solid waste and recycling containers
- Backhauling of recyclables to reduce transport costs⁵
- Support for the program by park management and park staff
- Participation by park concessioner
- Providing visitors and staff with information on the recycling program and making it

⁵Backhauling occurs when vehicles delivering materials to a park carry recyclables out of the park on the return trip.

easy for them to participate.

For more information, contact

Dale L. Sheier, Chief of Maintenance
605-745-4600

■ ***Yosemite National Park***

Yosemite National Park has a highly successful program originated by its former concessioner, the Yosemite Park and Curry Co. When the contract changed hands a few years ago, the new contractor, Yosemite Concessions Services (YCS), picked up where the old contractor left off. YCS also took over control of the old Dow Chemical-funded commingled recycling program serving visitors. The program has been significantly modified, and now relies completely on source separation.

Visitors have access to more than 100 different mini-recycling depots around the park, where containers are set up to collect rigid plastics (PET and HDPE), all colors of glass, and aluminum cans. An NPS-funded contractor collects the materials from the recycling depots and delivers them to the YCS warehouse for processing and preparation to be sent to market. The switch from a commingled program to a source separated program has led to a significant decrease in contamination rates, from roughly 20% to less than 2%. Visitors may also take their recyclable materials to two YCS-staffed drop-off locations where they may redeem their nickel deposits on drink containers.

A separate recycling program serves the YCS operations in the park. More than 25 different materials are collected, ranging from fluorescent tubes to batteries to four different grades of paper.

NPS offices also collect paper, which is transported by janitorial crews to the YCS warehouse for sorting and marketing.

One of the most significant aspects of the recycling program is the overwhelming success of the container deposit program. Sixty percent of all containers purchased in the park are redeemed by customers at the staffed drop-off locations. The other 40% of the containers, most of which end up in the source separated recycling bins, generate between \$40,000-\$50,000 per year in unclaimed deposits. YCS uses the money to subsidize its recycling program and other environmental initiatives in the park.

Because YCS sells so many drink containers each year, its suppliers voluntarily apply a small ink stamp to the bottom of the containers. Before YCS started applying this stamp, it had a significant problem with customers redeeming containers purchased

outside of the park. The new labeling system eliminates that problem entirely.

For more information, contact: **Mark Gallagher, Recycling Coordinator**
Yosemite Concession Services
(209) 372-1095

■ **Prince William Forest Park**

This 17,000 acre park, located 32 miles south of Washington, D.C., contracts out the collection and processing of recyclable materials to a local waste hauler. The program collects commingled recyclable materials from group camping areas and picnic and administrative areas. The park provides collection for aluminum and tin cans; green, brown, and clear glass; and HDPE and PET plastics in 96-gallon rolling toters. Corrugated cardboard is collected at group campgrounds in an eight-cubic-yard container. All materials are collected weekly. The park also has some four-cubic-yard containers at the maintenance yard that it uses to collect cardboard and paper waste generated in NPS offices.

Park staff note that contamination of bins in the campgrounds and picnic areas is frequently a problem. They believe that signs on the containers should be improved for better visibility, and some containers should be relocated nearer to trash receptacles.

The annual cost for the recycling program is approximately \$6,300 per year. The park does not receive any revenues from the sale of the recyclables.

For more information, contact

| |
|------------------------------------------------|
| Marcia Keener, Administrative Assistant |
| 703-441-6474 |
| Don Cory, Chief of Maintenance |
| 703-221-7161 |

Table 5
Summary of Recycling Programs in Three National Parks

| Park | Materials Recycled | Commingled or Source Separated | Recycling for Visitors | Recycling for Concessions | Recycling for Employees | Hauling/Processing |
|----------------------------|-----------------------------------------|---------------------------------------|-------------------------------|----------------------------------|--------------------------------|--------------------------------|
| Yosemite N.P. | 25+ materials | Source separated | Most materials | All materials | All materials | Concessioner |
| Wind Cave N.P. | A,G,OCC, ONP, ferrous, batteries, other | Source separated | G,P,A only | All materials | All materials | NPS crews |
| Prince William Forest Park | A,G,P, ferrous | Commingled | All materials except paper | A,G,ONP, tin | All materials | NPS crews and private contract |

Note: A= Alum, G=Glass, OCC=Corrugated cardboard, ONP= Newspaper, P=Paper, PL=Plastics

These and other NPS recycling programs provide important lessons for any park:

Start small. Changing solid waste practices may take time, and recycling every possible material may lead to failure. Start with a few commonly recycled materials, placing bins in only the highest volume areas. This will provide an indication of recycling volume and costs. Then gradually expand the program. Small victories are important and can lead to larger victories later.

Commingled programs have higher costs and higher levels of contamination than source separated programs, but may have higher visitor participation. Commingled programs are the exception rather than the norm in the NPS. Visitors find them more convenient, but the park must pay sorting costs. Where sorting facilities are readily available, however, the high volume of materials collected in commingled programs may outweigh the disadvantages.

Recycling programs need not apply to the entire park to be successful. Parks frequently aim their programs at visitors because they believe it is important to provide this service, but often the vast majority of waste is created by concessioners, park operations, and employees. Collecting materials generated by these sectors may not result in as much program visibility, but more waste can be diverted at a much lower cost.

Both public and privately managed systems can work effectively. In Yosemite, the concessioner essentially manages the entire program for the

park. In many other parks, all program services are provided by NPS crews. The arrangement selected will depend on many factors, including cost, staffing, equipment, and the level of management and employee interest.

Tracking Park Recycling Efforts

The new ISWAP performance goals require parks to track how much recyclable and compostable material they annually divert. In some cases, figures can be taken directly from weight tickets at a local processing facility. Sometimes these facilities estimate tonnage based on the volume of material delivered to them. This is also an acceptable approach, but be sure the conversion factors for volume-to-weight are comparable to the factors used in Appendix E.

Parks that have their recyclable material picked up as part of a longer collection route should be skeptical of any estimates provided by the hauler. Ask haulers how they calculate weight, paying particular attention to the volume-to-weight conversion factors they use, and their knowledge of how full the containers are on collection day. Consistently half-full containers will give a very different performance reading than containers that are always full.

A computerized tracking system may also be a good resource. George Washington Memorial Parkway uses the Maintenance Management Program (MMP) system to track its recycling program. GWMP assigns activity codes to different recyclable materials, allowing it to monitor how much of each material it collects, and how much the program costs. For more information on how to set up a monitoring system in your park, see Appendix H.

Chapter Summary: Recycling

Recycling is the most common waste diversion practice in the NPS. Programs vary widely between parks, however, reflecting differences in visitors, the local markets for recyclables, and the cost of waste disposal. Programs also vary widely within a park, and different populations in a park (visitors, concessioners, employees in park housing, NPS operations) are often asked to recycle different materials.

Key concepts:

- The most basic choice in designing a recycling program is deciding between a source separated and commingled program. Source separated programs tend to be less expensive to operate and generate cleaner material, but can be confusing for the public. Commingled programs result in higher volumes of collected material and higher visitor participation, but are more expensive to operate.
- Aluminum, paper products, glass, and plastics are the most commonly recycled materials in the park system.
- Starting small and gradually expanding is a good strategy for building a comprehensive recycling program. Recycling programs need not apply to the entire park to be effective.
- Parks are allowed to retain revenues from the sale of their recyclables and apply them to programs that help them comply with Executive Order 12873 and other waste management requirements. Parks negotiating new recycling contracts should require that all revenues be returned to the park or applied to defray the cost of the contract.

Chapter VI: **Composting**

Background

Composting is a process of accelerated biodegradation and stabilization of organic material under controlled conditions. In more simplistic terms, it is nothing more than a controlled version of the natural process of decay. A composting program is an attempt to speed up this process, with the goal of creating a product that can be reused in the park or elsewhere as a soil amendment.

Compost is generally used to return nutrients to the soil and help increase the soil's ability to retain water and supply nitrogen to plants. It can also serve many other purposes within parks: to help loosen compacted soil on trails; for erosion control (compost strengthens the root structure of plants along the shoreline or on hills); and as a bedding material for reseeding projects. Maintenance and resource management staff can likely come up with a lengthy list of potential uses at any park facility.

Any compost produced in a park should be tested to help determine its best use. As with other soil amendments or fertilizer, the compost must provide the blend of nutrients appropriate to the park's needs. An improper pH or excess loading of certain types of metals might harm instead of help plants. Resource management staff or a local university can help perform this testing.

Sources of Compostable Material

Most composting programs attempt to balance organic material rich in carbon with organic material rich in nitrogen. The "recipe" will vary depending on the available materials and how quickly the park wants to "manufacture" the compost.

Most parks have plentiful supplies of both carbon- and nitrogen-rich materials. Carbon-rich compostables include leaves, branches, sawdust, and materials more commonly diverted to a recycling program, such as office paper, newspaper, and corrugated cardboard. Other paper products, such as tissue paper and paper towels, can also be incorporated into a composting program. Nitrogen-rich organic materials include grass, garden cuttings, manure, and sewage or sewage sludge. Food waste from food service facilities (except meat products) is another nitrogen-rich material that is increasingly targeted by municipalities for composting.

Some organic wastes should *not* be composted. They include pet waste, diseased plants,

vegetation treated with pesticides, and exotic species of plants. It is particularly important to monitor exotic species to ensure their seeds are not spread with the compost.

Table 6
Compostable Material Commonly Found in National Parks

| Material | Pro | Con |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Grass | <ul style="list-style-type: none"> - abundant resource - good source of nitrogen | <ul style="list-style-type: none"> - rarely captured by a park (most simply "leave it on the lawn") - high nitrogen content leads to rapid decomposition that can create or exacerbate odor problems |
| Leaves | <ul style="list-style-type: none"> - abundant resource - decent carbon source | <ul style="list-style-type: none"> - rarely captured by a park, often blown back into the woods for natural decomposition - can be expensive and time-consuming to collect |
| Trees/wood chips | <ul style="list-style-type: none"> - abundant resource - excellent carbon source - good bulking agent in a composting pile | <ul style="list-style-type: none"> - downed tree limbs require chipping before use in a compost pile - may not need to compost them to receive their benefits (can be chipped and applied directly to trails) |
| Food waste | <ul style="list-style-type: none"> - often overlooked, but fairly sizable segment of the waste stream - good nitrogen source | <ul style="list-style-type: none"> - collection usually limited to food service facilities in a park - collection can be a problem, as material can smell unless refrigerated or removed quickly - often very wet, heavy to transport - more likely to attract animals/vectors than other sources of organic material |
| Horse manure | <ul style="list-style-type: none"> - abundant resource in parks with mounted police or horse stable operation - good nitrogen source | <ul style="list-style-type: none"> - very heavy to transport due to high moisture content - slightly acidic; must be blended with other materials to ensure suitability to wide range of horticultural uses |
| Paper products (office paper, newspaper, corrugated cardboard, chipboard) | <ul style="list-style-type: none"> - composting may be best solution for isolated facilities or regions where paper or cardboard recycling options are expensive - good carbon source | <ul style="list-style-type: none"> - usually requires some shredding before use in a compost pile - recycling the paper fibers may represent a "higher use" of these materials, as fibers can be used to make new products. If composted, fibers are lost forever. |
| Sewage sludge/raw sewage | <ul style="list-style-type: none"> - EPA regulations limit processing options for sludge, so composting is a good alternative - good nitrogen source - good source of moisture to compost pile | <ul style="list-style-type: none"> - facilities using sludge are more closely regulated - risk of anaerobic decomposition is greater |
| Pet wastes Diseased plants Vegetation treated with pesticides Exotic species of plants Meat waste | <ul style="list-style-type: none"> - n/a | <ul style="list-style-type: none"> - SHOULD NOT BE COMPOSTED |

Collecting Compostable Material

A composting program requires little in the way of special collection equipment. Leaves, grass, woodchips, and manure can generally be collected and transported using the park's dump trucks, flatbeds, front-end loaders, or garbage "packer" trucks. Parks may also consider renting a large open-top roll-off dumpster to store material, which local haulers can move around or out of the park for processing. Both Yosemite National Park in California and Rock Creek Park in Washington, D.C. use large dumpsters to store and transport manure.

Food waste is probably the most difficult material to collect and transport. In most commercial food waste collection programs, the material is collected in covered 30 to 55 gallon drums, and either removed daily or stored temporarily in refrigeration units. This is often required by local health officials, because it delays the onset of spoilage. Packer trucks or flatbeds with a rear lift-gate can then be used to transport the waste around or out of the park.

Composting Methods

There are five broad categories of composting methods, each of which has advantages and disadvantages.

- 1) **The compost "heap."** Truly the minimalist strategy, this method consists of piling up the organic material and leaving it for a few years. Such an approach requires few park resources, other than space. The center of these piles can be anaerobic during the first few years, however, and create odor problems if disturbed. This is a slow process, and the pile must remain on the site for years.

Equipment costs: None

- 2) **Windrows.** These are elongated, triangular- or quadrilateral-shaped piles of organic material. Windrows are usually 4 to 10 feet high, 8 to 20 feet wide, and as long as the site permits. Windrows are aerated mechanically, using a front-end loader, or preferably, a specially designed windrow-turning machine. Mixing the pile controls the composting process -- oxygen is introduced into the center, and steam and heat are released. Windrows are mixed 2 to 7 times per week during the active composting phase (usually 4 to 8 weeks), and then once per week thereafter during the "curing" phase⁶ (another 6 to 9 weeks). Turning more frequently can further reduce the amount of time until the compost is ready for use. Parks in the snow belt may find that their composting operation slows

⁶Curing refers to the aging process during which biological decomposition activity slows and ultimately stops.

during the winter months unless the windrows are covered in some way. Land requirements for windrow programs can be fairly significant.

Equipment costs: Small-scale windrow turner = \$12,000 - \$60,000
Large-scale windrow turner = \$100,000+

- 3) **Aerated static piles.** (Also known as forced aeration.) Organic materials are heaped on top of a blower/vacuum system that aerates the pile by either blowing or pulling air through it. Static piles are turned only near the end of the active composting phase, which lasts 3 to 5 weeks. Material composts faster with this system than in windrows, because oxygen and moisture levels are more closely controlled. Land requirements are less than windrowing, but energy demands to run the vacuum/blower system can be significant.

Equipment costs: Blower/vacuum system = varies w/ number of static piles

- 4) **In-vessel systems.** This method usually involves a proprietary technology or facility design. Material is placed in a large, enclosed container or facility. The enclosed nature of the system allows the operator to control odors and maximize the level of biological activity that occurs. Some systems rotate or mix the material with paddles to increase aeration. The active composting phase is relatively short, usually requiring only 1 to 3 weeks. Facility and operating costs tend to be extremely high, making this an impractical option for most parks. In-vessel systems are most commonly utilized when co-composting sewage sludge with other organic waste.

Equipment costs: Small in-vessel system = \$50,000 - \$200,000
Large in-vessel system = usually \$1 million +

- 5) **Worm composting.** Worm composting, also known as vermicomposting, relies on worms to help break down the compostable material. Although some larger programs operate around the country, most worm composting systems are small-scale and are used to serve a single office or employee residence. One pound of worms consume roughly one-half a pound of food waste per day.

Equipment costs: \$100 to \$2,000, depending on size of system

Key Operating Considerations

In addition to the selection of a composting technique, parks must make several other operating decisions.

Site selection. The location of a composting site should have good year-round access, be

isolated from the more heavily populated areas in the park, and be large enough to accommodate material both actively composting and in the curing stage. The site should have good drainage to prevent the accumulation of standing water: slopes of 2% to 3% are generally considered ideal. Initial site preparation may require surfacing with gravel or compacted sand to allow year-round use. An impermeable composting pad may be required by local regulators depending on the type of organic material composted, and how close the water table is to the surface.

Leachate control. Local health or solid waste siting restrictions may require parks to have a leachate control system. In most cases, yard waste facilities are exempt from these requirements. Facilities that co-compost organic waste with sewage or sewage sludge are more likely to require a leachate system, which usually involves a series of drains or channels to direct liquid runoff from the pile into a holding tank or evaporation pond. The fluid is then either treated and discharged, stored until it evaporates, or used to maintain moisture levels within the compost pile.

Commitment to appropriate composting management. Composting is a production process, and as such, it must be monitored and staffed by trained individuals. Poorly run composting operations can generate odors and produce compost that can actually harm the plants and soil it was intended to help. Parks considering a composting program must be prepared to devote the level of staff resources necessary to maintain the program on a regular basis, and reach out for assistance when problems arise. Many municipal composting programs have built links with local universities, nurseries, or farmers with expertise in this area. Parks must be prepared to do the same, particularly when it comes to developing a "recipe" for the compost, or conducting testing on input materials or the quality of the end product.

Regulatory Concerns

The NPS does not have composting regulations. Other federal and state regulations may apply to park composting operations, depending on how much material they process every year and what they compost.

For more information on state regulations, contact the state solid waste agency or health department.

Federal regulations apply only to co-composting of organic material with sewage sludge. (See 40 CFR Part 503.) This composting method must meet certain quality guidelines that may restrict where the compost can be used. Contact the regional office of the U.S. EPA for more information on these guidelines.

Composting in the Parks – Some Case Studies

Parks use a wide variety of composting systems, many of which are inexpensive and good quality models for other parks. Following are a few examples.

■ *Hampton National Historic Site (Towson, Maryland)* (Modified compost heap system)

This 67-acre park was a portion of the summer estate of an agricultural and mining magnate from the Revolutionary War era. The park features historic gardens dating back to the year 1770. The Grounds Division uses two chippers to reduce large deadwood and vegetation prunings into a manageable mulch, which it then mixes with garden debris, grass, and leaves to form the compost pile. A new compost pile is formed every year, and turned roughly every six weeks (all year long) using a front-end loader. Each pile is allowed to age for approximately two years before the material is used in the gardens, lessening the park's need for top dressings such as peat moss. Approximately 20 to 30 cubic yards of material is produced every year. Grounds crews spend approximately 10 hours per month maintaining the program, which they say is roughly the same amount of time they would spend disposing of this material as waste. Start-up costs for this program were negligible because the park had the heavy equipment on site.

Contact: Paul Bitzel, Horticulturalist
Dale Brukiews, Grounds Supervisor
410-962-5194

■ *John Muir National Historic Site (Martinez, California)* (Modified static pile -- no forced aeration)

In this program, three three-sided redwood containers, each large enough to hold approximately 12 cubic yards of organic material, are used to make and store the compost. Healthy orchard trash is chipped into 3-inch pieces for mulch, and some is rechipped into compost-size pieces (1/2-inch or less). These are layered between grass and other green clippings from orchard and ornamental plantings. Perforated 2-inch PVC pipe aerates the piles at 12-inch intervals. (The park currently uses scrap pipe, but would prefer to use 4-inch pipe.) When the bin is full, the composting material is wet to a moisture level of 40% to 50% and covered with heavy plastic or a tarp. In approximately six weeks the compost is finished, and is used immediately to amend heavy clay soil in gardens and orchards. The park produces approximately 250 to 300 cubic yards of material every year. The labor requirement to manage this program is about 10 hours per month. Currently, three of the four people working on this program are volunteers; if it was all paid staff time the cost of this program would be

roughly \$1,800 per year. Equipment costs (chippers, front-end loader, etc.) would be additional. The compost operation at John Muir N.H.S. has been used as a teaching facility for the local community and the California "Master Gardeners" program run by the state cooperative extension.

Contact: Herbert Thurman, Chief of Maintenance
510-228-1415

■ ***C&O Canal National Historic Park (Maryland)***
(Aerated static pile)

Paralleling the Potomac River for approximately 185 miles, the Chesapeake and Ohio Canal National Historic Park extends northwest from Washington, D.C. to Cumberland, Maryland. C&O has been composting raw sewage from port-o-johns along the canal for the last 20 years. Waste material is extracted from the toilets and transported to a holding tank located in the park. At the same site, a concrete pad has been constructed to serve as an impermeable foundation for the composting operation. A bed of sawdust, woodchips, and old compost is laid on the concrete pad and sewage is pumped onto this material, where it is rapidly absorbed. A 12-inch thick layer of woodchips and/or compost is laid next to this material, and perforated 4-inch plastic pipe is placed on top of it. The mixture of organic material and sewage is then placed on top of the pipe, and the entire pile is covered with another 12 to 18 inches of compost or woodchips, which serves to insulate the pile and act as an odor barrier. A blower system then pumps air through the pipe on a regular cycle for approximately four weeks. During this time period, the pile "cooks," achieving sustained high temperatures that kill pathogens in the waste material. Temperature is closely monitored throughout the composting operation. Finished compost is used around the facility for a variety of horticultural projects. Depending on the number of visitors, C&O composts 8,000 to 35,000 gallons of waste per year, and is completely self-sufficient in the handling of these wastes. Parks should be aware that obtaining operating and siting permits for this system was a very lengthy process.

Contact James Patterson, Research Agronomist
C&O Canal National Historic Park
(202) 342-1443

■ ***George Washington Memorial Parkway (Virginia/Maryland)***
(Small-scale in-vessel system)

This facility, located across the Potomac River from Washington, D.C., recently purchased a small in-vessel system from Green Mountain Technologies in Vermont (The system will be operational in May 1996.) It will be used to compost horse

manure and vegetative waste generated in the park and at some other Park Police stables in the National Capital Area. The system, which costs roughly \$75,000, features three components: an enclosed 45-cubic-yard container, shaped like a large roll-off dumpster, where the composting takes place; a mixing unit and conveyor belt that blends the compostable material and loads the composting vessel; and a controller unit that houses the on-board computer and air-blower unit. A "bio-filter," consisting of old compost, is also housed in the controller unit, acting as the air filtration system for the entire operation. The facility selected this system because it takes up very little space and because the material is produced very quickly (the active composting phase lasts just three weeks). It is also completely transportable (all of the equipment is built onto roll-off skids), and can be temporarily relocated to another part of the park (or another park entirely). The park expects to compost approximately 131 tons of material per year, using the material around the park for turf restoration and roadside applications. The park also purchased a trommel screen to allow it to screen the compost into different particle sizes, depending on the application.

Contact: Adam Badowski, Maintenance Worker Foreman
(703) 419-6402

Chapter Summary: Composting

Increasingly, parks are establishing composting programs to both reduce the size of their waste stream and produce their own soil amendment. The techniques used to compost materials range from simple to complex, but all require a commitment by the park to manage the program so that it benefits, rather than burdens, the park.

Key concepts:

- Grass, leaves and animal manures are the most commonly composted materials in national parks. In some parks, it may also be appropriate to compost paper products and/or sewage sludge, depending on the availability of other processing or disposal options in the region.
- Most materials require little in the way of special collection strategies, with the exception of food waste.
- The five categories of composting methods vary widely in the amount of space, equipment, and staff time they require.
- Composting programs must be sited to ensure that they do not detract from a visitor's experience in a park.
- Composting is not just a waste management technique -- it is also a production process, and it must be monitored and staffed by trained individuals to ensure that it is done appropriately.

Chapter VII:

Trash Collection Practices

Introduction

The largest solid waste management expense incurred in most national parks is trash collection. Depending on the park, these expenses can include labor, contracts with private haulers, capital equipment, and disposal charges. Parks incur these costs in their efforts to satisfy many different objectives:

- Maintain sanitary conditions in the park**
- Preserve park aesthetics**
- Provide convenient disposal options for visitors**
- Minimize costs**
- Promote other environmentally and economically preferred alternatives**
- Minimize competition with private trash haulers**

Although the first two objectives are arguably the most important, no consensus has been reached on how best to achieve them. Many parks provide 30-gallon trash containers at all roadside stops, picnic grounds, and other locations to maximize visitor convenience, under the theory that convenience is inextricably linked to the preservation of park aesthetics: If visitors don't have quick access to a trash can, they'll simply litter. Whether this is actually the case is the subject of some debate. On the following pages arguments are raised about the pros and cons of different collection strategies, including eliminating collection entirely and requiring visitors to take their trash with them when leaving the park.

Trash Collection System Alternatives

A range of trash collection approaches are used around the NPS. Sometimes the system is a function of the park's available equipment; other times, the system is a function of the park's geography. Typical systems include the following:

- 1) **Can-based systems.** Many national parks rely on 30-gallon trash containers for waste collection. These containers can be collected by "side-loading" trucks, pickup trucks, small packer trucks, or other vehicles. The following table presents some of the advantages and disadvantages of this type of system.

| Can-Based Systems | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pro | Con |
| <ul style="list-style-type: none"> • Visitor convenience and familiarity • Can be collected by smaller, less expensive vehicles than those required for large containers • Containers are relatively inexpensive • Can be easily relocated (assuming cans are not bolted or chained in place) • Appropriate for small amounts of waste • Can be placed where larger containers will not fit | <ul style="list-style-type: none"> • Metal cans require upkeep, can deteriorate under wet conditions • Time-consuming to collect • Small size means cans often overflow, creating litter • Must be emptied more often than large containers • Cans must be purchased, not rented • Animal-proof lids are sometimes required, and are often expensive and difficult to use |

Can-based systems work best where waste volumes are low, locations are inaccessible to large vehicles, and containerized collection is considered inappropriate.

The primary drawback of a can-based system is the expense of collection. Many more stops are required for such a system than for a dumpster-based or "containerized" system. In addition to labor costs, can-based systems sometimes use capital equipment inefficiently; if a packer truck is used, for example, waiting time can be a significant cost because the vehicle is so costly to operate on an hourly basis. The George Washington Memorial Parkway remedies this by sending a crew to "precollect" the cans, removing and replacing the plastic liner bag, so the packer truck can quickly drive through and simply pick up the bags of trash.

Widely distributed can systems may also send a message to visitors that solid waste is a no-cost service provided by the park, and that their waste generation habits do not have an economic or environmental impact.

- 2) **Dumpster (containerized) systems.** There are three primary types of containerized systems: those emptied by a front-loading packer truck, those emptied by a rear-loading packer truck, and "roll-off" dumpsters that require a special collection vehicle. The selection of a system is determined primarily by the volume of waste and the number of collection stops.

Front-loading dumpsters have slots on the side of the container into which lift arms are placed to help hoist the dumpster over the cab of the truck. The dumpster is emptied into an opening in the top of the vehicle. Rear-loading dumpsters are braced against the rear hopper of the packer truck, and a winch cable lifts the bottom of the dumpster so it tips into the hopper. Front-loading dumpsters come in a variety of sizes, ranging from one-half a cubic yard up to eight cubic yards. Rear-loading dumpsters are limited in size to four cubic yards or less, because the shape of the hopper prohibits anything larger.

Each of these approaches differs in its labor requirements. Front loaders generally do not require the driver to get out of the vehicle to empty the container, meaning a single employee can operate the truck. Rear-loading systems require either the driver or a second employee to get out of the truck to move the dumpster into place. Because of this, rear loaders tend to be less efficient.

Front loaders are significantly more expensive than rear loaders, typically costing \$125,000 or more. Small rear loaders start at approximately \$75,000, and increase in price with the capacity of the truck.

Both front- and rear-loading dumpsters must be placed near the roadside to ensure access by the collection truck. This often means that they cannot be sited as conveniently as smaller trash cans, such as in the middle of a picnic area. The large size of the containers also makes it difficult for shorter or handicapped visitors to reach them. Some parks have solved this problem by using large dumpsters with sliding doors on the side.

For many parks, the primary consideration in size of container is cost, and here dumpsters are more efficient than smaller trash cans. The large size means they must be emptied less frequently and that they are less likely to overflow and create litter problems.

| Dumpster-Based Systems | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pro | Con |
| <ul style="list-style-type: none"> • Allow for inexpensive collection of high trash volume • Containers are difficult to steal • Location of containers can be changed relatively easily • Equipment is available in most areas • Less likely to overflow than smaller containers, minimizing blowing litter • Containers can be rented rather than purchased, so the quantity of containers can be increased during peak season | <ul style="list-style-type: none"> • Must be placed near roadside to allow collection truck access • Unsightly, may require park to construct some type of enclosure if placed in a public area • Larger containers can be difficult to access by small or disabled visitors |

- 3) Mixed Systems.** Several national parks rely on a combination of these systems. Olympic National Park, for example, has dumpsters throughout the park, but relies on smaller trash cans in selected areas that are emptied into the dumpsters. The locations where trash cans are used tend to be inaccessible by large collection trucks, or where dumpsters would be unsightly. Yosemite National Park relies extensively on cans for visitors and places dumpsters in less prominent locations. Maintenance staff empty the cans into the

dumpsters, and then use a front loader to empty the dumpsters. Grand Canyon National Park uses several small side-loading trucks to empty roadside cans in low visitation areas, and uses a front loader to empty containers in higher visitation areas.

- 4) **Roll-off and compacting dumpsters.** In maintenance yards and remote areas, roll-off dumpsters and compacting dumpsters may provide significant savings. Both require specialized equipment to transport, and compacting dumpsters must be operated by trained personnel.

Roll-offs come in a variety of capacities, ranging from 10 to 40 cubic yards. A 30-cubic-yard dumpster can hold an average of four tons of loose waste. Roll-off containers can generally be rented, rather than purchased, from the local waste hauler. Prices for rental and transport vary, and some states regulate transport costs. Roll-offs are advantageous when waste can be stored until the container is full; where odor, vectors, and animals are not problems; and where sufficient space exists. The purchase price of a roll-off container ranges from \$3,000 for a 10-cubic-yard container to \$5,000 for a 40-cubic-yard container.

Compacting dumpsters are useful where containers are emptied frequently or when transport distances are great. These dumpsters come in a range of sizes: Smaller units (four to eight cubic yards) can be used with front- or rear-loading vehicles, while larger units are transported like roll-off containers. Small units range in price from \$5,000 to \$8,000, while larger self-contained units cost from \$15,000 to \$20,000.

Small units can be placed near visitor-generated trash collection areas or on loading docks. In general, access to compactors should be restricted to trained personnel, but some municipalities have installed coin-operated containers in rural locations for direct public use.

Large compacting containers are appropriate for very high waste volume locations. Most of these containers compact at a ratio of 3:1, and can hold 12 to 15 tons of waste. Parks considering the use of large containers must determine whether the load will exceed allowable weight limits on roads in the area.

- 5) **Unusual systems.** Several national parks have unusual system requirements dictated by their geography. Sleeping Bear Dunes National Lakeshore, located on the shore of Lake Michigan, compacts waste collected from North Manitou Island and ships it to the mainland. Similarly, Stehekin, located on Lake Chelan in North Cascades National Park, transports compacted waste to the mainland in boxes weighing approximately 100 pounds each. Isle Royale, also located on Lake Michigan, previously incinerated its waste, but a recent solid waste management study recommended the use of small containerized bales for transport off island.

These systems can be expensive to operate. At Sleeping Bear Dunes and Stehekin, waste is handled in many different stages by park personnel (e.g., collected, compacted, loaded for transport, unloaded/disposed), which adds labor costs. Stehekin is currently examining ways to reduce this cost.

Table 7
Estimated Prices for Solid Waste System Components

| Component | Estimated Cost |
|-----------------------------------|---------------------------------------|
| 30-gallon metal trash can | \$50 |
| 2-cubic-yard dumpster | \$600 |
| 4-cubic-yard dumpster | \$750 |
| 10-cubic-yard roll-off | \$3,000 |
| 40-cubic-yard roll-off | \$5,000 |
| 15-cubic-yard compacting dumpster | \$15,000 + \$1,000 annual maintenance |
| 30-cubic-yard compacting dumpster | \$17,000 + \$1,000 annual maintenance |
| Rear-loading packer truck | \$75,000 + |
| Front-loading packer truck | \$125,000 + |
| Co-collection packer truck | \$150,000 + |

Relationship Between Solid Waste Collection and Waste Diversion

A park's solid waste collection program should not be considered separate or distinct from its recycling program; in fact, the two can work together.

Regardless of whether the park uses cans or dumpsters, the trash collection system must emphasize the availability of recycling bins in the park. Preferably, recycling bins will be co-located next to trash containers, but at a minimum, signs should be posted on or near trash containers indicating where recycling bins are located. At Hurricane Ridge in Olympic National Park, small signs are attached to each trash can lid informing visitors where the nearest aluminum can recycling bin is located.

If the park does not provide visitors with ready access to recycling bins, recycling levels may suffer. While most visitors are willing to recycle, many may not be willing to go out of their way to do it. At the National Mall, park managers have addressed this situation by placing a recycling bin adjacent to each trash container. This is a costly solution, however, and a similar system format in Yosemite was scrapped because collection was too costly.

Another factor to consider is that recycling bins may be contaminated by regular trash if they are set too far apart from trash containers. A number of parks have reported that when they attempted to highlight the availability of recycling bins by isolating them from the trash bins, the public, lacking a disposal alternative, placed their trash in the recycling bin along with their recyclables.

Systems that allow the co-collection of trash and recyclables are receiving more widespread consideration around the country. This method can lower the collection cost of recycling, since only one vehicle is required to collect all materials. There are two variants on this strategy. The first is the "blue bag" approach, where all recyclable materials are placed in blue (or some other designated color) trash bags, and thrown in with the rest of the trash. At the solid waste facility, the material is dumped out, and the blue bags are pulled from the pile and diverted to a recyclables processing operation. The remainder of the material is then landfilled or incinerated.

Although this system sounds rather straightforward, it is rarely used for two reasons. First are concerns over the quality of the recyclables received at the recycling facility. (The plastic bag does not offer complete protection from liquids and other contaminants.) Another is that the facility must be sized and designed to accommodate the receipt of both trash and recyclables. This is a costly proposition, and few municipalities or private companies have made the investment thus far.

The second approach involves "co-collection vehicles" or packer trucks that have been compartmentalized to accommodate both trash and recyclables. The interior of the truck has actually been subdivided, and two independent compacting mechanisms move the material from the hopper into the body of the truck. In some cases, the compartmentalized truck is a "dual-rear load," which means materials are thrown into side-by-side rear hoppers. The "side-load/rear-load" truck has one hopper in the back of the truck, and another on the side.

Parks ordering such vehicles must designate the allocation of space inside the truck. This involves estimating how much of each material they will collect; estimating incorrectly would mean one side of the truck would fill up before the other. This would eliminate any efficiency gain of the truck, because it would have to stop and tip its load at the recycling or trash disposal facility before continuing on with its route.

Co-collection truck prices are high, beginning at about \$150,000

Trash Collection Case Studies

The following case studies represent some of the diverse strategies used by various national parks to address solid waste collection requirements.

■ ***Olympic National Park***

Olympic National Park is very large and has a number of remote collection sites. Collection costs are high at these sites, and the park is experimenting with adding additional dumpsters to reduce the collection frequency there. The park is also investigating the use of larger roll-off containers to collect waste at high-volume remote areas. A large concession in the park, which uses a 30-cubic-yard roll-off, has achieved a significant cost savings over the old dumpster-based program.

In 1990, the park replaced roadside and campground containers with two-cubic-yard dumpsters, which it purchased jointly with its private hauler. Some trash cans have been retained, primarily near visitor centers, to provide convenience and to eliminate litter. The park has had few problems with the removal of roadside or trailside cans, litter has not increased, and expenditures on solid waste staffing have been significantly reduced.

For more information, contact: Fred Manzer
Maintenance Division
360-452-0305

■ ***Indiana Dunes National Lakeshore***

Indiana Dunes is located on Lake Michigan, 60 miles southeast of Chicago. The park has a very high level of summer day use, and because of this seasonal nature of visitation, it has designed a flexible solid waste collection program. During the peak summer months, trash containers are placed widely throughout the park. These containers are collected by NPS staff, who travel by foot, pickup, and in some cases by all-terrain vehicles.

Trash containers are used to prevent litter on the lakeshore, because the park does not believe that a pack-in/pack-out strategy (see below) would work for lakeshore areas. Trash from these containers is transported to centralized roll-offs and dumpsters, which are emptied on a contract basis by a local private hauler. All day-use areas have trash cans, while the campgrounds rely on centrally placed dumpsters. The trash cans are emptied daily during the summer, while the dumpsters are emptied one to three times per week, depending on location.

The program is very cost-effective for the park. Summer collection is handled by seasonal staff and Youth Conservation Corps employees. The park has minimal capital equipment for the solid waste program; the bulk of it is owned by the private hauler.

For more information, contact: Keith Weiser
Maintenance Division
219-926-7561

The Pack In/Pack Out Alternative

Long a tradition in the backcountry, "pack-in/pack-out" is the embodiment of the old adage "leave nothing but footprints." In other words, if hikers bring something into the backcountry, they are obligated to take it back out.

Most national parks and forests with backcountry areas expect hikers and backpackers to adhere to this policy. As parks become more sophisticated in their solid waste strategies, some are becoming interested in applying this backcountry practice to more heavily utilized park areas. The benefits are numerous: Solid waste expenditures often decline; park aesthetics improve; and visitors have fewer encounters with bees and wildlife attracted to trash bins.

In recent years, several state park agencies around the country have taken the lead in experimenting with more widespread use of pack-in/pack-out (also known as "carry in/carry out") at their facilities. Two primary variations on this strategy have been attempted:

- 1) Total elimination of trash cans from the park. Under this scenario, visitors are given trash bags when they enter the park, and are expected to carry out all solid waste they generate. This strategy has been attempted primarily in remote areas and infrequently visited parks in a number of states.
- 2) The park keeps trash cans/dumpsters in public campgrounds, but eliminates them from all day use areas, such as picnic grounds and roadside parking lots. Visitors are given trash bags upon entrance to the park. This strategy has been attempted at a number of parks in Massachusetts, Pennsylvania, Michigan, Minnesota, and Washington.

Results of Pack In/Pack Out Programs

This program appears to be effective in selected areas of parks and in remote locations. Most state park officials emphasize that this is not a suitable program for parks close to urban areas and major highways, where visitors tend to be less cooperative about taking their waste with them. Organized campgrounds are also generally excluded from these programs because of the difficulty in forcing campers to hold onto their waste for several days.

At most parks, however, public reaction has been generally favorable. Trash collection costs have either dropped dramatically or been eliminated altogether, and litter levels have increased

only slightly. On the negative side, many parks have reported an increased incidence of contamination of the recycling bins in their park, and an increase in complaints from local businesses outside the parks where visitors dump their trash. The latter was such a problem at the state beaches in New Hampshire that the state stopped the pack in/pack out program, returning the trash cans to their original locations. The program is still in place at all other New Hampshire state parks, however.

A number of parks in Michigan use a modified version of the pack in/pack out program, removing all trash cans from around the park but locating a large dumpster at the park entrance/exit. Visitors are given a plastic trash bag when entering the park and asked to hold onto their trash until they leave.

A number of states rely on donations or subsidies of the plastic trash bags by local businesses, state transportation and environmental agencies, and the U.S. Forest Service.

Pack In/Pack Out Lessons for the NPS

In many cases, it would be difficult for the NPS to totally remove trash cans from a facility. Park managers may want to consider selective use of this strategy around their facility, however, as a means of reducing collection and disposal costs. Most parks currently place trash receptacles all around their park for the convenience of visitors. A small-scale pilot program will indicate whether a park can effectively scale back on its number of bins. As noted above, Olympic National Park in Washington has seen a sizable change in collection costs now that it has removed trash cans from most roadside turnouts.

In selecting a location for a pilot program, parks should target sites or regions where they can clearly identify any increase or reduction in costs. The computerized MMP system should help to isolate any change in labor expenditures on trash collection and litter pickup. Contracting Officers can help calculate any change in trash hauling or disposal contracts.

When establishing the program, post easily visible signs notifying visitors of this change in practice. The signs should either inform visitors of where they can dispose of their trash (e.g., "The nearest trash can is located at ...") or request that visitors take their waste with them when they leave the park.

Chapter Summary: Trash Collection Practices

NPS garbage collection programs send visitors an important message about solid waste management policies. Widely distributed cans prevent litter, but they may discourage visitors from taking their waste home with them, or from recycling or understanding the impact of discarding waste. Parks have different collection strategies appropriate to their visitation, geography, and availability of private resources.

Key concepts:

- Solid waste collection is an essential component of an overall waste reduction and diversion strategy. The design of the waste collection system should complement other programs initiated by the park.
- Waste collection sites offer an opportunity to provide visitors with environmental information and to encourage waste reduction.
- Appropriate collection methods depend on geography, visitation, and other factors. Compacting or roll-off containers can provide significant savings in remote or high-volume locations. Private waste haulers are an important resource in providing information on the latest technology in containers, vehicles, or other equipment suitable to each park.
- Increasingly, the backcountry custom of packing out one's trash is being adapted for use in more heavily utilized parks. Increases in litter tend not to be a problem, although occasionally levels of contamination rise in recycling containers as visitors look for a disposal alternative. Most state parks experimenting with this strategy report that it works best in relatively remote facilities. It is less suitable for parks close to urban areas and major highways.
- The removal of all trash cans, combined with the placement of a dumpster at the park exit(s) may be a good compromise that helps keep the park clean without placing too large a burden on visitors or businesses outside of the park. A small pilot program can be an effective tool in helping determine whether the removal of some trash receptacles makes sense.

Chapter VIII: Disposal Facilities

Background

Like it or not, some waste is destined for some type of disposal facility. Even with very successful source reduction, recycling, composting, and other diversion efforts, at least 40% (and often much more) of waste usually ends up in the local landfill or incinerator.

Most park units have little involvement with these facilities, using them only as a repository for their waste. Seven national parks currently have landfills operating within their boundaries (see Table 8 below), and many more are responsible for some form of monitoring of landfills closed long ago. Two national parks currently have some type of incineration facility operating on site.

Table 8
On-Site Disposal Facilities

| | |
|---------------------------------------|-------------------|
| <u>Landfills Operated by NPS</u> | |
| Big Bend N.P. | Grand Canyon N.P. |
| Death Valley N.M. | Lava Beds N.M. |
| Glacier Bay N.P. | |
| <u>Landfills Operated by Others</u> | |
| Mojave N.P. | |
| Santa Monica Mountains N.R.A. | |
| <u>Transfer Stations</u> | |
| Cape Cod National Seashore (proposed) | |
| <u>Incinerators</u> | |
| Statue of Liberty N.P. | Isle Royale N.P. |

Regardless of their current landfill or incinerator situation, all parks should devote a section of their ISWAP plan to disposal site issues, especially in light of the fact that many parks rely on facilities that will close in the future.

NPS Landfill Regulations

In 1984, Congress enacted legislation prohibiting the operation of solid waste disposal sites within the NPS, except those operating as of September 1984 (16 U.S.C. 4601-22[c]). Regulations were finalized in early 1995 in the form of 36 CFR Part 6 (*Solid Waste Sites in Units of the National Park System*; hereafter "the rule") which carries out the provisions of the Act. The rule severely restricts the creation of new solid waste sites in national parks and controls the operation of other sites still in use. (See 36 CFR 6.4 [sites not in operation on September 1, 1984]; 36 CFR 6.5 [sites in operation on September 1, 1984]; and 36 CFR 6.6 [sites within new additions to the national park system.])

The rule states that new landfills can be created only if several conditions are met, including:

- the proposed site must dispose only park-generated waste
- no reasonable alternative exists outside park boundaries
- the proposed site must not degrade park resources
- the proposed site must comply with federal, state, and local regulatory programs
- the proposed site must not be used for the storage, handling, or disposal of solid waste containing hazardous material, incinerator ash, lead acid batteries, PCBs, EPA-registered pesticides (7 USC.136 et seq), sludge or sewage, petroleum, non-sterilized medical waste, radioactive materials, or tires.

Other limitations are described concerning size and land ownership.

The rule also describes the conditions existing landfills must meet to continue operation in a national park. Although these are less stringent than the conditions placed on new sites, the rule clearly states that landfills are inconsistent with the mission of the NPS and recommends that these sites be closed. The regulations for existing landfills describe their size and capacity requirements, monitoring requirements, and other operating conditions.

Parks with active landfills are required to provide information in their ISWAP plan describing the steps they are taking to comply with 36 CFR Part 6. They must also provide information on the expected lifespan of their landfill (time until the facility closes), and outline their contingency plans if the landfill is required to close earlier than expected. If the estimated lifespan of the landfill is less than five years, parks must outline their process to identify alternative disposal sites.

NPS Incinerator Regulations

Like landfills, incinerators operating within park boundaries are considered undesirable. Staff Directive 82-2 states that "On-site incineration of solid waste will only be used if there is no

feasible alternative, and its use must be approved" by the appropriate Field Director. Feasibility determinations will be based on "sound engineering judgment and natural resource protection practices, which includes, but is not limited to consideration of: proper management and protection of natural resources; safety; effects on the total environment; and economics."

ISWAP Requirements for Parks Reliant on External Disposal Sites

Parks reliant on disposal facilities outside their boundaries are not exempt from concerns over the status or management of these facilities. The disposal facility section of an ISWAP plan should therefore describe the characteristics of the current disposal facility, including:

Facility currently used by the park unit. The ISWAP plan should identify the incinerator or landfill the park uses, its daily capacity, the price trend for that facility over recent years, and any changes in regulatory practices that may affect the park. Many landfills, for example, ban disposal of certain materials (e.g., tires, yard waste), and additional materials may be banned in the future. The park must also verify that the disposal site is sanctioned by the authority (i.e., federal, state, county, city) with jurisdiction for the disposal site.

Estimated lifespan of the facility. A key issue for most park units is the availability of disposal capacity in the future. The ISWAP plan should document the expected lifespan of the facility used by the park and identify alternatives if the remaining life is less than five years.

Identification of Disposal Alternatives

Depending on the lifespan of the current disposal facility, it may be necessary to identify alternate methods (such as recycling or composting more waste) and their costs and benefits. These alternate practices have been described in previous sections of this handbook.

If, however, additional diversion cannot be attained, the selection of a new disposal option may or may not be a simple choice. Some parks will have only one economically viable alternative. Others may have several options, at different prices and distances from the park. In these situations, the park should develop estimates of the following:

- Distance to the facility
- Estimated transport cost (via truck or rail, compacted or loose)
- Estimated lifespan of the facility

As part of this analysis it may be useful to price out the cost of construction of a solid waste transfer station. Table 9 shows how these facilities can be relatively inexpensive to operate in parks generating higher tonnage levels, comparing quite favorably with other disposal options on a cost/ton basis.

Table 9
Transfer Station Cost Estimates

| Cost Type | Size of Facility (in tons of trash per day) | | | | | |
|------------------------------------|---------------------------------------------|---------|---------|---------|--------|--------|
| | 5 | 20 | 54 | 88 | 150 | 600 |
| Annualized capital cost (\$/ton) | \$17.55 | \$13.06 | \$11.54 | \$8.20 | \$3.33 | \$2.98 |
| Annualized operating cost (\$/ton) | \$21.30 | \$13.02 | \$15.54 | \$12.78 | \$6.63 | \$2.68 |
| Total annual \$/ton | \$38.85 | \$26.08 | \$27.08 | \$20.98 | \$9.96 | \$5.66 |

Source: Northwest Economic Consulting

Note: Based on actual facility costs around the U.S. No NPS sites are included.

In examining the transfer station option, parks should consult with professional engineers for advice. In some parks, road weight restrictions limit the ability to transport compacted waste over long distances, making distant but inexpensive disposal options impractical.

Implementation and Timeline

Parks that need to change the destination of their solid waste should develop a transition schedule. This schedule should include the designation of the responsible person for each step of the transition, and what regulatory approval is required, if necessary.

Chapter Summary: Disposal Facilities

Few national parks have disposal facilities within their boundaries, yet all parks must be concerned about the availability of disposal space. The ISWAP plan must consider the availability of disposal space at reasonable prices for a significant timespan.

Key concepts:

- Even with successful diversion programs, some waste will be landfilled or incinerated.
- The ISWAP plan should consider the price, capacity, and regulatory changes that may affect disposal practices.
- If less than five years remain in the lifespan of the existing disposal site, active efforts should be made to locate alternative sites.
- Transfer stations may represent a reasonable alternative to the construction of disposal facilities within park boundaries.

Chapter IX:

Special Waste Materials

Background

Several waste materials that require special handling are generated within parks. These materials may be hazardous, difficult to manage, or have special characteristics that require different treatment from the rest of the park's solid waste. Some of the materials requiring special treatment include:

- Tires
- Wooden pallets
- Lead acid, household (alkaline) and rechargeable nickel cadmium batteries
- Scrap metals
- Construction and demolition (C&D) debris
- Used oil
- Used oil filters
- Solvents
- Antifreeze/coolant

NPS Special Waste Materials Regulations

With the exception of used engine lubricating oil, the NPS currently does not have any regulations regarding the disposal of the above materials. Instead, parks are subject to any applicable federal, state, and local regulations. Virtually all 50 states regulate the management of used tires because of concerns over fire hazards and the fact that their shape makes them prime breeding grounds for mosquitoes. Local, state, or regional environmental agencies have more information on these regulations. Parks are also referred to the NPS *CERCLA Guidance Manual* (January 1994) for a complete discussion of potential CERCLA liabilities related to the handling of this material.

Note on Liability Associated with Recycling:

The recycling strategies discussed here for special wastes that contain hazardous substances (e.g., batteries, used oil, solvents, and antifreeze) could subject the NPS to some measure of liability, if these hazardous substances are subsequently released into the environment by the recycler or any other party. NPS units are nonetheless encouraged to attempt to recycle these materials, so long as efforts are made to ensure the processing facility is appropriately licensed and operated.

Strategies for Managing Special Wastes

With the exception of household batteries, most special wastes generated in a park come from park or concessioner operations. This makes for simple management of these materials, because parks need establish only one or two collection locations. Strategies for special waste management within the park system are as follows:

Tires. Maintenance operations generate waste tires, as do concessioner-run service stations. Tire management is usually covered by state or local laws, which tend to ban the landfilling of these materials, and impose some fee-based deposit system to help cover the cost of managing tire disposal. Because of this regulatory environment, tire management within a park is usually well-defined. For tires generated within the maintenance unit, collection can often be arranged with the park's tire supplier. A small collection fee may be charged.

Parks with illegal tire dumping problems may have to make special arrangements for the disposal of these tires. The NPS's National Capital Area arranges for the disposal of tires from parks in the Area as part of its hazardous waste disposal contract.

Tires can also be recycled in a variety of ways. They can be sent out for retreading, for example, and reused on park vehicles. Recycled tire products have also become common, including boat bumpers, mats, rubberized asphalt, and most commonly, construction materials.

Wooden pallets. Every year, millions of board feet of timber are used to make shipping pallets. Until recently, however, there has been little recognition that pallets are a valuable resource that should not be simply thrown into the dumpster. Parks can use a variety of management strategies to recycle wooden pallets:

- Repair and reuse them, or find a local company that specializes in this service.
- Give them away to local businesses by advertising their availability with the local Chamber of Commerce. Some businesses may be willing to pay the park for them.
- Give them to employees for use as framing for home composting systems -- three pallets will create a three-sided open-topped system.
- Mulch them with other wood waste. (If pursuing this option, be sure that all nails are removed ahead of time.)

Parks can also prevent pallets from accumulating by requiring that suppliers take away one pallet for every pallet they drop off. This requirement can be built into any contract bid.

Batteries. Lead acid batteries are prohibited from disposal in most states, and because of

this, most automotive batteries are recycled. Many parks arrange for the removal of old batteries through their current battery supplier.

No federal regulation governs the disposal of common household (e.g., dry cell or alkaline) batteries; some states and localities, however, have imposed disposal bans on these products. Municipalities using incinerators or other resource recovery facilities almost always try to minimize the number of batteries incinerated because of concerns over air quality impacts. Thus, battery recycling options have increased in recent years. There is often a processing cost imposed for battery recycling, which is based on a price per pound of batteries. Contact the trade association listed in Appendix B for more information on recycling options.

Regardless of whether the park is attempting to recycle wet cell, dry cell, or ni-cad rechargeable batteries, it should ensure that it complies with the guidelines of the *Universal Waste Rule* (40 CFR Part 273), which applies to the management of batteries and certain widely generated wastes.

Scrap metal. Most parks with large maintenance operations generate significant quantities of scrap metals such as brass, copper, iron, and steel. The management of these materials varies widely between parks. Some facilities collect these materials unsorted and contract for their recycling on a fee-for-service basis. Other parks sort these materials into separate piles or dumpsters and then contract for recycling. At Mt. Rainier National Park, for example, the park earned over \$20,000 in 1994 from the sale of separated scrap metal.

Local scrap dealers can usually be found in the Yellow Pages of the local telephone directory.

Construction and demolition (C&D) debris. Construction and demolition debris is rarely treated as part of the park's regular waste stream. If a building is constructed or demolished, or if a road is rebuilt, most parks simply require the contractor to remove the debris from the park. In the past, this material was then usually landfilled; now, however, the market is strong for recovering and recycling this waste. Sometimes the material is recovered and reused, sometimes it is recycled into another product, and sometimes it is crushed and used as bedding material for a new road or parking lot. Parks can promote these activities by requiring contractors to recycle waste material generated at a construction site.

To encourage this practice, the NPS Denver Service Center (DSC) has developed a nationwide computerized database of companies that recycle construction debris. This

database is one segment of the "Sustainable Design and Construction Database"⁷ developed by the DSC. Each entry contains the company's name, address, telephone number, a description of the products it accepts for recycling, and the date this information was last verified. Fifteen graphic icons allow the user to quickly identify what category of materials each company accepts, including:

- | | |
|-----------------------------|---------------------------------------|
| 1. Appliances | 9. Metals |
| 2. Carpet pad and carpet | 10. Paints and solvents |
| 3. Corrugated cardboard | 11. Plastics |
| 4. Gases (freon and halon) | 12. Asphalt roofing |
| 5. Gypsum wallboard | 13. Rubble (asphalt, concrete, brick) |
| 6. Glass | 14. Salvaged building parts |
| 7. Land-clearing debris | 15. Wood |
| 8. Light bulbs and ballasts | |

To order the database, contact the Technical Information Center at the DSC at (303) 969-2130.

The DSC has also developed a standard contract that builds in requirements that contractors develop a waste and recycling plan for debris generated by construction or demolition projects. Other sections of the contract encourage contractors to use recycled content or other environmentally responsible materials, and to minimize product packaging. Copies of this model contract are available from the DSC at the above telephone number.

Used oil. NPS units that generate used engine lubricating oil must manage that oil according to the guidelines in Chapter 6 ("Used Oil Management") of the *NPS Hazardous Waste Management Handbook*. According to that handbook, the NPS has a three-tiered approach for managing used oil.

First, parks should attempt to recycle the used oil by shipping it offsite to an approved facility that will reclaim the oil for re-refining processes.

If that option proves uneconomical, parks may be allowed to either:

- create a mixture of used oil and diesel fuel for use in generator vehicles (see 40 CFR 279.20[a][3]), or
- burn the used oil for energy recovery.

⁷Release 2.0 of the database is available on 3 1/2" disks, and is intended for use in a Windows™ environment; at least 7 MB of hard drive space is required to run the database. DSC hopes to eventually make the database available via the Internet.

The viability of these two non-recycling options depends on the degree of contamination of the used oil. Again, parks should refer to Chapter 6 of the *Hazardous Waste Management Handbook* for guidance on what constitutes acceptable levels of contamination. Parks electing to burn the used oil must also adhere to restrictions on the source of the oil and the oil heater design.

Parks interested in recycling oil usually contract with a private company to collect and process the material. These contractors will be concerned that the oil is contaminated with some other material, which makes it very expensive to dispose of. Thus, parks should establish secure locations for used oil collection within their maintenance yards.

If the park does not have an established used oil program, capital and operational costs will be incurred in developing one. First, storage containers (either 55-gallon drums or above-ground storage tanks) must be purchased. Spill kits should also be kept on hand, along with chlorinated hydrocarbon screening kits. The latter are very inexpensive, and can quickly determine the presence of contaminants in the waste oil.

Operational costs include hauling the oil to the drop-off point within the park, hauling the storage container to the recycling center (usually a contracted cost), extra costs for any contaminated loads, and staff time to manage the program and provide employee education. Educational costs to the park should be low because most employees are familiar with oil recycling programs and will need information only on the location of bins.

Used oil filters. Recently, oil filters have become a recyclable commodity: They contain high-quality steel and can be readily recycled by most foundries. They also contain oil, however, and because of this many states prohibit their disposal in landfills. In some areas oil filters are incinerated for their energy content.

Oil filters collected for recycling should be "hot drained" for at least 12 hours by puncturing the filter anti-drain back valve or the filter dome when it is near engine operating temperatures. Alternatively, filters can be crushed or dismantled to remove the oil. With few exceptions, oil filters do not contain hazardous metals. Filters manufactured by members of the Filter Manufacturing Council (80% to 85% of U.S. production) have not contained terne plating (an alloy of tin and lead) since 1993. Terne-plated filters are used in heavy-duty vehicles and equipment and must be disposed of as hazardous waste in most states unless they are recycled.

Oil filters should be collected and stored in a 55-gallon container, which will hold approximately 250 automotive-size filters. If the park has a storage problem, it can use crushing devices to significantly reduce the size of and remove oil from filters. The filters can be stored in the same location as used oil, and most companies that

recycle oil for a park will also recycle oil filters. The cost of a used-oil filter program is usually minimal if an oil recycling program is already in place.

Solvents. Most parks have a solvent collection and recycling program, often using the same contractor as for oil recycling.

Yellowstone and Grand Teton National Parks have gone beyond this method and entered the used solvent distillation business on their own. Each year, using equipment based in Yellowstone, the two parks distill 15 to 20 barrels of used cleaning solvents, creating clean new material that satisfies all of their solvent needs. The distillation unit purchased by Yellowstone cost \$7,600 in 1991, and Yellowstone spends roughly \$1,600 on labor costs every year to run the machine. For more information on this process, contact the Yellowstone National Park Maintenance Division at (307) 344-2301.

Antifreeze/coolant. Used engine antifreeze is typically a mixture of 50% water and 50% antifreeze. Antifreeze is mostly ethylene glycol, with small amounts of corrosion inhibitors. It is not classified as a hazardous waste, but it occasionally contains heavy metals and other contaminants. Regardless of contamination, used coolant should never be discharged to surface water, to the ground, or into a septic system.

Coolant recycling may be done off-site or on-site. The park may hire a recovery company, which will remove the used engine coolant from a storage tank and transport it to a centralized facility for recycling. This option may not be available to parks located in remote areas.

On-site recycling can occur through either a mobile facility or an on-site facility. Mobile facilities are available in many areas, and can handle filtering, distillation, centrifugation, ion exchange, reverse osmosis, and replacement to the engine system. On-site equipment can be purchased from many vendors, and may be cost-effective depending on the volume of coolant generated by the park.

Chapter Summary: Special Waste Materials

Most parks generate waste materials requiring special handling or disposal. In many cases, the handling is governed by state or federal regulations. Parks establish contractual agreements with private haulers or processors to dispose of these materials, although in some cases the park may be able to develop strategies on its own.

Key concepts:

- Special materials are generally regulated and require disposal or recycling at licensed facilities. Contact the local or state environmental agency for more information on local requirements.
- Special wastes are often generated in a few confined sites, making management of these wastes relatively straightforward.
- Recycling and disposal of special waste materials can be costly, but certain materials can generate revenue.

Chapter X:

Educating Visitors and Staff About the Park's Program

Background

A good education program is critical to the success of any park's integrated solid waste management program. Visitors must know what the park is doing, why the park is doing it, and how they can help. For instance, they must know what and where they can recycle, and how to "prepare" the material. In addition, parks that want to encourage source reduction should provide visitors with tips about how to prevent waste while they are in the park. In both cases, it is important that these efforts mesh with other park programs to educate visitors about preserving natural resources.

Perhaps the most important decision a park makes about its education program is how conspicuous it will be. Will the park place signs everywhere, or only in selected locations? Will it actively encourage NPS staff to remind people to recycle, or will it deliberately play down public exhortation? A key factor here is deciding how important solid waste messages are in relation to other environmental messages in the park ("Stay on trails," "Don't feed the animals," etc.)

Hallmarks of a Good Education Program

Given that interpretation is such a central component of many park programs, most staff are well-versed at effectively communicating environmental themes to the public. Interpretive staff can be key to the development of an ISWAP education program. Factors they may consider include:

- Keep messages simple and straightforward.
- Keep the message "local," rather than global. Remember that the primary goal is to change the visitors' behavior in the park.
- Use repetition to reinforce messages.
- Use graphics, such as the universal recycling symbol, to help non-English speakers.
- Discuss the park-specific details (what, where, why) of the program.
- Discuss how the program fits in with the mission of the NPS.
- Discuss why the program is structured this way. This is important if the program significantly differs from another NPS facility in the region.
- Practice what the park preaches -- print any brochures on recycled paper (and label it as such). Use recycled content materials whenever possible in designing signs or recycling collection stations.

Techniques for Getting the Word Out

Although the cost and/or a shortage of staff time may prevent the park from incorporating all of the following elements into its education program, they represent a sampling of techniques commonly used to educate visitors at other parks:

Reach out to visitors *before* they enter the park. Since they actually import much waste into the park, consider taking steps to communicate with them before they enter the front gate. Work with the local media, interagency information centers, travel agents, and tour companies to get the word out. If the park or the park's concessioner has an advance reservation system for hotel rooms or campground space, consider inserting a small brochure discussing how visitors can reduce waste during their visit. (Parks can save paper by printing this information on the back of the reservation envelope.)

Communicate with visitors frequently while they are in the park. The park has many opportunities to place recycling, source reduction, and "buy recycled" messages before visitors while they are in the park. Potential opportunities include:

park publications, such as park maps and park newspapers that discuss things to do while in the park
slide shows or exhibits at the visitor center or museum
signs in high traffic areas
posters on park bulletin boards and shuttle buses
interpretive activities, such as ranger talks or slide shows about solid waste issues in

"Conservation Behavior": What the Research Tells Us

The field of "conservation behavior" attempts to understand how to influence individuals to engage in environmentally responsible behavior. Research in the field provides some general lessons that are important to parks that are structuring education plans.

- 1) *Personal appeals and "model behavior" make for a powerful combination.* If visitors see NPS staff picking up litter or recycling after being told why it is important, they are likely to engage in the activity themselves.
- 2) *Written commitments are a strong indicator of future behavior.* A visitor who makes a written commitment to recycle during campground registration or after an interpretive talk is likely to carry through on that pledge. The simple act of signing a pledge form creates a sense of responsibility for their actions while in the park.
- 3) *Positively worded signs ("Please help by recycling" and "Please help us keep the park clean") tend to be more effective than negatively worded signs ("Please don't litter") at fostering certain types of behavior.* If these signs are located near recycling bins or trash cans, they can act as constant reminders throughout the park.

- the park
- public service announcements broadcast on the park radio station
- public service announcements broadcast on a hotel concessioner's closed circuit television system
- using napkins, placemats, or grocery bags printed with "green tips" at concessions operations
- posting information about the park's solid waste program in hotel rooms, retail stores, and food service establishments in the park
- announcements by tour bus or shuttle bus operators when they stop at an area where recycling bins are found

Interpretive activities. Consider offering interpretive activities concerning solid waste and recycling issues. If park staff is not available, invite local waste management officials, recycling companies, and environmental groups to make presentations to the public. Some parks with on-site recycling facilities offer tours of their operation. If a local recycler is willing to give tours of its facility outside the park, publicize how visitors can make reservations, and provide directions to the facility.

For parks interested in developing their own interpretive activities, local and state education and environmental agencies can probably provide curricula to use. A number of public, private, and nonprofit organizations that have developed solid waste or resource management curricula are listed below in Table 10. Contact the publisher to obtain detailed information on each curriculum before making any purchase.

Use the park exit as an opportunity to educate. The park can communicate a final effective message if it asks visitors to drop off any maps or other park publications that are still in good condition before they leave the park. Not only does this cut down on overall printing costs, it also reinforces the message that reuse can be as important, if not more important, than recycling.

Table 10
Solid Waste/Recycling Curricula

| Name | Available From: | Price | Grade Levels |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|
| A-Way with Waste | Washington State Dept. of Ecology 3190 160th Ave. SE Bellevue, WA 98008-5452 206-649-7043 | \$28.50 | K-12 |
| Closing the Loop | Chadbourne & Chadbourne 18554 Haskins Road Chagrin Falls, OH 44023-1823 216-543-7303 | \$32 | K-12 |
| Lets Reduce & Recycle: A Curriculum for Solid Waste Awareness 530/SW-90-005 Recycle Today: Educational Materials for Grades K-12 530/SW-90-025 | U.S. EPA 800-424-9346 | free | K-12 |
| Mobius Curriculum | Browning Ferris Industries (BFI) P.O. Box 3151 Houston, TX 77253 800-BFI-8100 | free | 4-6 |
| No Waste Anthology | California Dept. of Toxic Substances Control P.O. Box 942732 Sacramento, CA 94234-7320 916-322-0476 | free | K-12 |
| Recycle Hawaii for Kids | City & County of Honolulu Recycling Office Division of Refuse Collection and Disposal 650 South King St. 6th Floor Honolulu, HI 96813 808-527-5335 | free | 9-12 |
| Recycling: Mining Resources from Trash | Cornell University Resource Center 7-8 Business & Tech Park Ithaca, NY 14850 607-255-2090 | \$8 | not stated |
| Super Saver Investigators | Ohio Dept. of Natural Resources Division of Litter Prevention and Recycling Educational Specialists: SSI Fountain Square, Building F-2 Columbus, OH 43224 614-265-6333 | \$25 | K-6 |
| Teachers Resource Guide for Solid Waste and Recycling Education | Association of Vermont Recyclers P.O. Box 1244 Montpelier, VT 05601 802-229-1833 | \$45 | K-12 |
| Waste Away | Vermont Institute of Natural Science P.O. Box 86 Woodstock, VT 05091 802-457-2779 | \$21.95 | 4-8 |

The Role(s) Employees Play in a Solid Waste Education Program

Employees play two key roles in the success of a park's solid waste management program. First, they must be active participants at their own offices by recycling, using recycled content products, and reducing the amount of waste they generate wherever possible. Second, given that many of them have frequent contact with visitors, they also serve as models of any recycling education campaign.

For both reasons, employees must be well-versed in the "what, why, and where" of the park's integrated solid waste management program. Information should be frequently offered and reviewed at staff meetings, orientations for new employees, and in a regular "environment" column in the employee newsletter. The park may also consider inviting a local recycling company or public works official to make a presentation to staff.

Restrictions on Signage

NPS 52, the NPS guideline on signs in a park, does not contain any reference to recycling-related signs. It is therefore up to each park unit to decide whether a sign is necessary or appropriate at a given location. According to the *NPS Sign Manual*, this decision must "bear in mind longstanding NPS policy to minimally intrude upon the natural or historic setting in National Park Service areas, and to avoid the unnecessary proliferation of signs..."

Key points to consider when planning signage include:

Parks interested in purchasing basic recycling signs ("Glass Only," "Please Recycle," etc.) should contact Federal Prison Industries at (805) 735-2771. (Ask for the sign shop.) The park's System Support Office solid waste management coordinator may also have the names of suppliers used by other parks in the region. Where possible, try to use recycled content materials in these signs to help close the recycling loop. The Curecanti National Recreation Area recently installed a number of signs made entirely of recycled plastic.

If the park is host to many foreign visitors, it may be important to use signs that rely on pictures rather than words to communicate what and where they can recycle. It is also important that signs and symbols are consistent throughout the park.

In historic buildings or districts, the park may need approval from the appropriate compliance specialists or local authorities before selecting and posting signs.

Case Studies

Solid waste-related education efforts take many forms in the NPS. Concessioners have been particularly creative in communicating information to their customers. Some notable examples include:

- **Denali National Park and Preserve.** Denali Park Resorts provides box lunches to guests on its Tundra Wildlife Tour. The lunch is packaged in a recyclable corrugated cardboard box, and a note from the concessioner catches customers' eyes when they open the box. The text includes the following statement:

... In addition, please keep all food on the bus and assist your guide with our recycling program by placing aluminum cans and cardboard boxes in the proper collection receptacles. The souvenir mug in the box lunch is for you to use at the beverage stop today and for complimentary hot beverage refills at the Denali National Park Hotel, McKinley Chalet Resort, and McKinley Village Lodge.


- **Olympic National Park.** Both the Kalaloch Lodge and the Log Cabin Resort post a sign similar to this in every hotel room bathroom:

If You Care About Our Environment,
Please Don't Throw in the Towel.

To help protect our environment, Kalaloch Lodge is implementing a Towel Saver Program. In doing this we hope to help reduce the amount of laundry detergent being released into our waterways. If you would like your towels changed, please drop them into the bathtub or shower. If you do not require fresh towels, simply return them to the towel rack.

Thank you for your support.

- **Yosemite National Park.** Yosemite Concessions Services prints environmental tips on all grocery bags, drink cups, and placemats given out at their operations around the park.
- **Grand Teton National Park.** The Grand Teton Lodge Company places a note (see next page) in every hotel room telling guests how they can recycle.
- **Big Bend National Park.** The park regularly publishes a wide variety of information about recycling in the park. All new employees are given a two-page "Resident's Guide to



Recycle!
Once Is Not Enough

THE GRAND TETON LODGE COMPANY
HAS AN AMBITIOUS RECYCLING PROGRAM
AT ALL OF OUR FACILITIES IN
GRAND TETON NATIONAL PARK.

WE RECYCLE . . .

- NEWSPAPER
- ALUMINUM CANS
- CARDBOARD
- BROWN & CLEAR GLASS
- TIN
- COMPUTER PAPER
- WHITE OFFICE PAPER

YOU MAY GIVE YOUR RECYCLABLES
TO ANY OF OUR HOUSEKEEPING STAFF
OR DROP THEM OFF AT THE
CHEVRON SERVICE STATIONS AT
JACKSON LAKE LODGE,
COLTER BAY VILLAGE, OR MOOSE.

YOUR PARTICIPATION IN OUR
PROGRAM IS GREATLY
APPRECIATED!

Recycling in Big Bend National Park." Updates are printed regularly in the *Big Bend Bull*, a community newsletter for park employees. Information for visitors is published in the *Big Bend Paisano*, the park newspaper. The article encourages visitors to participate in the recycling program, and tells them how much material was recycled by the park the previous year.

- **Maine Department of Conservation (Bureau of Parks and Recreation).** This state parks agency teamed up with the Maine Waste Management Agency to develop a short brochure entitled "Camping, Recreation, and Waste Reduction." The brochure is given to all visitors to Maine state parks. It includes a number of tips on planning ahead to help reduce solid waste levels. Copies of the brochure can be obtained by calling the Bureau of Parks and Recreation at (207) 287-3821.

Chapter Summary: Education

Education is an important component of any ISWAP plan. A good education campaign reaches both visitors and employees through a wide range of approaches. Many effective strategies can be borrowed from other parks, environmental organizations, or government agencies.

Key concepts:

- One of the most important decisions parks make about their education program is how conspicuous it will be in comparison to other environmental messages promoted in the park.
- Parks can educate visitors during every phase of their visit:
 - prior to their visit, during the planning stage
 - at the park entrance
 - during interpretive programs
 - at campgrounds
 - at trailheads and on hiking trails
 - at concessioner facilities
 - as they leave the park
- Employee education is important, both in terms of ensuring that park employees know recycling requirements in their own offices, and also so they can help educate visitors about the park's recycling program.
- The field of conservation behavior has identified principles that will help a park foster "green" behavior by visitors.

Chapter XI: Partnerships in Solid Waste

Background

Because of the popularity and high visibility of the NPS, most parks can find partners interested in cooperating on a solid waste project. Partnerships can benefit both the park and its partner, but agreements should be entered carefully and structured to preserve the interests of both parties. Cooperation on solid waste issues between the NPS and private parties can include any or all the following:

- Shared facility ownership;
- Joint operation of solid waste, recycling, or other programs;
- Provision of services, including consulting, labor, and machinery; and
- Provision of materials or supplies

There are numerous advantages and a few disadvantages to partnerships. The case studies described below will illustrate some of the experiences parks have had in setting up solid waste management partnerships.

NPS Policy on Partnerships

The NPS has a long history of working with non-federal partners to accomplish mutually beneficial projects that could not have been completed with the same timeliness or efficiency by the NPS alone.

The NPS encourages such partnerships in the area of solid waste whenever they will help the

Partnerships in the National Parks: Experience From the Field

Many national parks have experimented with partnerships in solid waste management, and the experience has been generally positive. Partnerships can:

- 1) *Reduce overall solid waste management costs.* Partners to the national parks often contribute financial or human resources in exchange for the opportunity to publicize this relationship.
- 2) *Bring outside expertise to bear on local problems.* Sometimes a park does not have the time or skill to tackle a solid waste management issue. A partner can bring detailed knowledge of landfill regulations, sorting of solid waste, or other skills useful to the park.
- 3) *Put issues on the table that have not been addressed in the past.* Although most parks have some type of recycling program, partners may propose new designs or approaches that the park has not considered.
- 4) *Promote goodwill in the community.* Several parks report that partnerships generate goodwill in the surrounding community.

Service accomplish its mission more effectively.

Case Studies

Several partnership agreements have been established in the area of solid waste management. These include:

Dow/Huntsmen partnership with seven national parks
Conoco/DuPont/James River partnership with Yellowstone National Park
Community service programs at Great Falls Park, part of the George Washington Memorial Parkway

- Community group partnerships at several parks
- College/university research assistance

Following is detailed information on each program:

- ***Dow/Huntsmen partnerships.*** From 1991 to 1994, the Dow Chemical Company and the Huntsmen Chemical Corporation sponsored recycling programs in Acadia N.P., Everglades N.P., the National Mall, Yosemite N.P., Great Smoky Mountains N.P., Grand Canyon N.P., and Mt. Rainier N.P. Most of these parks did not have visitor recycling programs prior to this partnership. These programs were characterized by:

commingled collection of plastics, glass, and metal containers generated by park visitors;
complete funding by Dow/Huntsmen;
defined start and end dates for Dow/Huntsmen's support of the program; and
separate operation from the rest of each park's solid waste program.

Several important lessons were learned from this partnership. First, in some of the parks, this partnership brought an issue to the table that had not previously been seriously considered; as a result, recycling became a regular part of the solid waste program in each park. Although each of the parks has modified the program since the partnership ended, none has abandoned visitor recycling as a waste management option. The existence of this program also led other parks to consider recycling as part of their solid waste systems. This appears to be the strongest legacy of the program.

Second, the parks learned that programs must be park-specific in design and operation. The original Dow/Huntsmen program was similar in each of the seven parks, which turned out to be an inappropriate program design. Differences in material prices, collection and transport costs, and other factors demanded flexibility.

Now that the partnership has ended, each of the parks has tailored its program differently. In Yosemite, the program has been integrated into a pre-existing program operated by the concessioner. In Smoky Mountains National Park, problems with plastic contamination may limit the visitor program to one that collects only aluminum. At Mt. Rainier, tin is no longer collected, and all materials are now source separated. Other parks have made similar changes.

Finally, the parks learned that park managers should be involved in the program set-up, design, and operation. In the original program, park maintenance and interpretive staff were not involved in the inception of the program. As a result, staff commitment was not as great and the program was less successful than it could have been.

- ***Conoco/DuPont and James River partnership.*** In 1992, Conoco and a number of other businesses funded a waste characterization study in Yellowstone National Park. In addition to the waste audit, an evaluation of current recycling programs in the park was conducted, and information was provided on suppliers of recycled materials and purchasers of recyclable materials. The project was designed and managed by Conoco with input from the NPS. The park used the results of the study to make modifications in its solid waste and recycling programs.

More recently, Conoco funded a storage facility for crushed green glass used by the park as part of its glassphalt road building operation. (The park uses 5% green glass aggregate in the asphalt mixture when building or repaving parking lot areas.)

- ***Community service programs.*** In this program, individuals fulfilling court-mandated community service sentences provide clean-up services to the national parks. At Great Falls Park, for instance, these workers transfer and sort recyclable materials.
- ***Community group partnerships.*** Perhaps the most common solid waste partnerships operating within national parks are informal arrangements with community groups. Several parks have arrangements with the Boy Scouts or similar groups to pick up aluminum and other materials from park locations. For example, Olympic National Park has an informal agreement with the Boy Scouts to collect aluminum from certain campgrounds within the park. At other national parks, private citizens have been allowed to collect aluminum cans on the condition that they also collect and recycle glass containers. At Smoky Mountains National Park, a organization employing handicapped individuals has a contract to sort and process recyclables from the park.
- ***University/college research partnerships.*** Several parks have relied on research assistance from local colleges and universities. For example, a student from the University of Michigan School of Natural Resources conducted research on the recycling program for Sleeping Bear Dunes National Lakeshore. Other parks have

received similar help, ranging from assistance in the development of an ISWAP plan to studies on visitation, transportation, and other issues. Parks should recognize, however, that the quality of work they receive can vary widely, and their goals for a study may differ from the student's or professor's goals.

Such partnerships all tend to be very inexpensive for the park to operate, are easy to start and stop, and promote goodwill with the local gateway community. On the down side, the park may give up some control over the program or lose revenues from the sale of the recyclables. The quality of service may also vary from group to group. Overall, however, most park managers report that these informal partnerships have served them very well.

More Information on Partnerships

In 1993, the Management Institute for Environment and Business in Washington, D.C. published *Forming and Managing Partnerships — A Guide for Agency Employees*. The handbook is designed to assist federal agencies interested in pursuing partnerships, and it contains a variety of important and useful ideas. The Do's and Don't's cited in the report include:

Do:

- Research the prospective partners to learn about their reputations and capabilities. Clearly define objectives of a potential partnership and the resources that each side would bring to the activity. Spell out the often lengthy time periods required to initiate and approve a partnership. Investigate alternative strategies for executing the objective. Could other avenues or partners execute the objectives more effectively?

Don't:

- Wait until the last minute to bring in agency general counsel, public relations, and agreement experts to review the dimensions of the contemplated partnership.
- Endorse an external product that will be put up for sale.
- Solicit funding for a partnership from private sources unless you are statutorily authorized to do so.

For copies of the handbook, contact the institute at:

Management Institute for Environment and Business
1220 16th St. NW
Washington, D.C. 20036
(202) 833-6556

Chapter Summary: Partnerships in Solid Waste

Partnerships with outside organizations can be an effective way for a park to manage one or more components of its solid waste program. The structure of the partnership can take a number of different forms, all of which can be effective.

Key concepts:

- No formal NPS policy regulates partnerships in solid waste management, though overall NPS policies on partnerships apply to those concerned with solid waste.
- If structured properly, these partnerships can bring outside financial and technical resources to help solve pressing park problems.
- Partnerships can result in significant cost savings for the NPS if equipment or labor is shared. For example, equipment that is too large for NPS needs may be economically viable if NPS and concessioner waste is combined.
- Partnerships must be structured to reflect local circumstances and discuss any transition after the partnership has ended.

Chapter XII:

Affirmative Procurement

Background

"Affirmative procurement," or the use of the purchasing process to achieve environmental benefits (or minimize environmental consequences), has been a federal policy since 1976. Originally conceived of in the Resource Conservation and Recovery Act (RCRA), the goal of affirmative procurement was reaffirmed by Executive Order 12873 (*Federal Acquisition, Recycling, and Waste Prevention*). The Executive Order directs agencies to modify their purchasing practices to enhance markets for recyclable materials and achieve other environmental benefits.

Central to this process is the role of the EPA in establishing minimum content standards for certain designated products. At the time the Executive Order was issued, EPA had developed recommended purchasing guidelines for five products, including cement and concrete containing fly ash, paper and paper products, re-refined lubricating oil, retread tires, and building insulation products. On May 1, 1995, EPA designated 19 additional items and announced the issuance of recommended guidelines for these products. Existing paper and paper product guidelines were also modified to reflect some requirements of the Executive Order and changes in technology. A summary of the minimum recycled content recommendations for these products is listed in Table 11 at the end of this chapter.

NPS Affirmative Procurement Responsibilities

Under RCRA Section 6002 and the Executive Order, effective May 1, 1996, agencies spending more than \$10,000 per year on the products listed below are required to buy the item with the highest recovered material content possible. The content recommendations found in Table 11 should be used as guidance; ultimately each park must determine whether a given product meets its own performance requirements. Parks failing to procure products meeting these guidelines must provide written justification "...that a product is not available competitively within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price." (Dept. of Interior *Guidance on Pollution Prevention and Right-to-Know, Recycling, and Green Acquisition*, 9/95.)

Although the requirements do not apply until May 1, 1996, it is possible, and encouraged, to purchase materials containing these levels of recycled content before that date. As time goes on, and technology and market conditions change, EPA expects to further revise these recommendations and narrow the range of recycled content suggested for these products.

Parks are required by RCRA Section 6002(i)(2)(B) to educate staff about the new guidelines, and notify current and potential vendors, suppliers, and contractors of the park's intention to buy recycled content products. EPA recommends educating employees by:

- preparing and distributing the park's affirmative procurement policies
- publishing articles in park newsletters and publications
- incorporating affirmative procurement program requirements into park staff manuals
- conducting workshops and training sessions to educate employees about their responsibilities under the park's affirmative procurement programs.

Additional steps park staff can take to foster green procurement are listed below.

Waste Prevention Procurement Tips

What a park buys and how it buys it has impacts on waste generation in and out of the park. Everything a park uses generates waste in its use, disposal, transport, or manufacture. It is therefore important to incorporate waste prevention principles into the purchasing process. Following are a number of ways to do this:

- **Follow EPA's affirmative procurement guidelines found at the end of this chapter.**
- **Buy off of GSA's *Environmental Products Guide***, which lists more than 3,000 products considered environmentally preferable. The guide is available from GSA at (800) 848-8928. In the future, the guide will also be available via the GSA Advantage On-Line Shopping Service, located on the World Wide Web. GSA's Web address is <http://www.gsa.gov>
- **Inform non-GSA suppliers of the park's interest in waste prevention.** Ask them to help the park identify products that:
 - are less toxic in use, manufacture, or disposal
 - have the least amount of product packaging but still arrive in good condition
 - contain recycled content
 - are recyclable or reusable by others
 - use the least possible amount of input materials, energy, or water
- **Make sure purchasing specifications do not exclude environmentally "preferable" products.** For instance, "brightness" standards may inadvertently preclude the use of unbleached recycled paper.
- **Build environmental standards into contracts and purchase orders.** At a minimum, require that any multi-page proposals be printed on both sides of recycled-content paper. Contact the Denver Service Center at (303) 969-2130 to get a copy of its "model" procurement contract for goods and services.
- **Set up a review process whereby the purchasing team works with field staff to review commonly ordered products or orders exceeding a certain dollar amount.** This review process should identify alternative products to consider for purchase. Criteria for review should include the five critical waste prevention standards specified above.

EPA also recommends educating existing contractors and potential bidders of NPS preferences by taking some of the following actions:

- publishing articles in appropriate trade publications;
- participating in vendor shows and trade fairs;
- placing statements in solicitations; and
- discussing the park's affirmative procurement program at bidders' conferences.

Affirmative Procurement Reporting Requirements

Under RCRA 6002(i)(2)(D), parks are expected to track purchases of the five recycled content materials for which guidelines currently exist. Starting in 1996, with the first report due in 1997, parks should expect to similarly track the 19 additional materials. Reporting requirements have not yet been established by the Office of Management and Budget (OMB), but EPA suggests tracking:

- the minimum percentages of recovered material content in the items procured or offered;
- comparative price information on competitive procurements;
- the quantity of each item procured over a fiscal year;
- the availability of each item with recovered material content; and
- performance information related to the recovered material content of an item.

The Department of Interior's *General Guidance on Pollution Prevention and Right-to-Know, Recycling, and Green Acquisition* more generally states that bureaus "...ensure that current information is readily available concerning ...green acquisition for any reporting requests by Federal and state regulatory agencies."

Additional Resources

Implementing the Requirements of Executive Order 12873: A Practical Guide for Government Agencies. Office of the Federal Environmental Executive. (To be released Spring/Summer, 1996.) To obtain a copy, contact (202) 260-1297. This document will also be available electronically on ENVIRO\$ENSE, EPA's electronic bulletin board system. Dial (703) 908-2092. Modem settings are 8-N-1. ENVIRO\$ENSE can also be accessed through the World Wide Web at <http://www.es.inel.gov/index.html>

Environmental Procurement Strategy: EPA's Action Plan for Implementing Executive Order 12873 on Federal Acquisition, Recycling, and Waste Prevention. August 1995. Document # EPA200-R-95-001. To obtain a copy, contact: (202) 260-4600

Contact the RCRA Hotline at (800) 424-9346 to obtain copies of the following documents:

Comprehensive Guideline for Procurement of Products Containing Recovered Materials; Final Rule. May 1, 1995. EPA (40 CFR Part 247) FRL-5198-7.

Recovered Materials Advisory Notice (RMAN), May 1, 1995. EPA. (SWH-FRL-5198-8).

Recovered Materials Advisory Notice (RMAN) – Supporting Analyses. April 1995. EPA Office of Solid Waste.

Draft Paper Products Recovered Materials Advisory Notice (RMAN) – Supporting Analyses. February 1995. EPA Office of Solid Waste (EPA 530-D-95-001).

Table 11
Recommended Affirmative Procurement Guidelines
(Effective May 1, 1996)

Columns with percentages identify the range or minimum level of recycled content that the product should contain. The first column, "recovered material," refers to the total amount of material diverted from the waste stream that is incorporated into the product. "Postconsumer" generally refers to material captured by some type of curbside, drop-off, or office recycling program. For more detailed definitions, refer to the EPA *Recovered Materials Advisory Notice* (RMAN) issued on May 1, 1995. The final column refers to whether the guideline is in final or draft form. Draft guidelines will probably be updated by the EPA in 1996.

| Product Category (Example) | EPA Recommended Level of Recovered Fiber in the Product | EPA Recommended Level of Postconsumer Recovered Fiber in the Product | Status of Guideline |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------|
| Paper and Paper Products | | | |
| – Newsprint | 40% to 100% | 40% to 85% | draft |
| – Bathroom tissue (commercial quality) | 100% | 25% to 60% | draft |
| – Paper towels (commercial quality) | 100% | 40% to 60% | draft |
| – Paper napkins (commercial quality) | 100% | 30% to 60% | draft |
| – Facial tissue (commercial quality) | 100% | 30% | draft |
| – Industrial wipers | 40% to 100% | 40% | draft |
| – Tray liners | 100% | 75% | draft |
| – Corrugated containers (<300 psi) (300 psi) | 40% to 50% 30% | 40% to 50% 30% | draft draft |
| – Solid fiber boxes | 40% | 40% | draft |
| – Folding cartons | 100% | 40% to 80% | draft |
| – Industrial paperboard (e.g., tubes, cores, drums, and cans) | 100% | 45% to 100% | draft |
| – Miscellaneous (e.g., pad backs, covered binders, book covers, mailing tubes, protective packaging) | 100% | 75% to 100% | draft |
| – Padded mailers | 5% to 15% | 5% to 15% | draft |
| – Carrierboard | 25% to 100% | 15% | draft |
| – Brown papers (e.g., wrapping paper and bags) | 40% | 20% | draft |

| Product Category (Example) | EPA Recommended Level of Recovered Fiber in the Product | EPA Recommended Level of <u>Postconsumer</u> Recovered Fiber in the Product | Status of Guideline |
|---------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------|
| - Reprographic paper (e.g., xerox/laser printer paper) | 20% | 20% | draft |
| - Offset paper | 20% | 20% | draft |
| - Tablet paper/notepads | 20% | 20% | draft |
| - Forms (checks, cash register tape, computer printout/greenbar) | 20% | 20% | draft |
| - Envelopes | 20% | 20% | draft |
| - white wove | 10% to 20% | 10% to 20% | draft |
| - white/color kraft | 10% | 10% | draft |
| - unbleached kraft | | | draft |
| - Cotton fiber paper (e.g., stationery) | 50% | 20% | draft |
| - Carbonless paper | 20% | 20% | draft |
| - Coated paper (e.g., brochures) | 10% | 10% | draft |
| - File folders (manila and colored) | 20% | 20% | draft |
| - Dyed filing products | 20% to 50% | 20% | draft |
| - Cards (e.g., index, postal) | 50% | 20% | draft |
| - Pressboard report covers/binders | 50% | 25% to 30% | draft |
| - Tags and tickets | 20% to 50% | 20% | draft |

Vehicular Products

| | | | |
|-------------------|---------------------------------------|---------------------------------------|--------|
| - Lubricating oil | 25% | 25% | final* |
| - Retread tires | no specific content recommendation | no specific content recommendation | final* |
| - Engine coolants | no specific content recommendation | no specific content recommendation | final |

Construction Products

| | | | |
|-------------------------------------|-------------|-------------|---------|
| - Fiberglass insulation | 20% to 25% | 20% to 25 % | final |
| - Cellulose loose-fill and spray-on | n/a | 75% | final** |
| - Structural fiberboard | 80% to 100% | n/a | final |
| - Laminated paperboards | 100% | 100% | final |

| Product Category (Example) | EPA Recommended Level of Recovered Fiber in the Product | EPA Recommended Level of Postconsumer Recovered Fiber in the Product | Status of Guideline |
|-------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------|
| -- Cement and concrete | Follow American Society for Testing and Materials (ASTM) standards | Follow ASTM standards | final*** |
| -- Carpet | 20% to 25% | 25% to 100% | final |
| -- Floor tiles/patio blocks | 90% to 100% | 90% to 100% | final |

Transportation Products

| | | | |
|------------------------------------|--------------|-------------|-------|
| -- Traffic cones (PVC/LDPE/rubber) | 50% to 100% | n/a | final |
| -- Traffic barricades | 100% same | 80% to 100% | final |
| -- HDPE/LDPE/PET/steel | | n/a | final |
| -- fiberglass | | | |

Park and Recreation Products

| | | | |
|------------------------------------------|-------------|-------------|-------|
| -- Playground surfaces/running tracks | 90% to 100% | 90% to 100% | final |
| -- Rubber or plastic | | | |

Landscaping Products

| | | | |
|------------------------------------|------------------------------------------------------|----------|-------|
| -- Hydraulic mulch (wood or paper) | 100% | n/a | final |
| -- Yard trimmings compost | See Recovered Materials Advisory Notice (RMAN) | See RMAN | final |

Non-Paper Office Products

| | | | |
|--------------------------------------|-----------------------------|--------------------------|-------|
| -- Office recycling/waste containers | Varies by type, see RMAN | Varies by type, see RMAN | final |
| -- Plastic desktop accessories | 25% to 80% | 25% to 80% | final |
| -- Toner cartridges | see RMAN | see RMAN | final |
| -- Binders | Varies by type, see RMAN | Varies by type, see RMAN | final |
| -- Plastic trash bags | 10% to 100% | 10% to 100% | final |

Notes: * Lubricating oil and retread tires guidelines effective in 1989.
 ** Cellulose loose-fill and spray-on insulation guidelines effective in 1990.
 *** Guidelines for concrete containing fly ash effective 1984, GGBF slag guidelines effective 5/1/96.

Chapter Summary: Affirmative Procurement

The products a park buys can influence how much waste it generates; thus, procurement practices are an important consideration when developing a comprehensive solid waste management program.

Key concepts:

- In accordance with Executive Order 12873, EPA has developed guidelines NPS purchasing agents should consider when purchasing selected types of products.
- All park employees, and particularly those with purchasing responsibilities, should keep these guidelines in mind when buying goods and services for the park. Parks should begin tracking purchases of these items to meet proposed reporting requirements.
- GSA specifically notes which products in its catalog include recycled content. Non-GSA suppliers should be informed that waste prevention is important to the park, and that their assistance in helping the park achieve its environmental goals would be appreciated.

Appendix A: **Glossary**

Anaerobic decomposition -- the state of composting when the center of the compost pile lacks oxygen, and bacteria that thrive on this lack of oxygen begin to increase their level of activity. Signs of anaerobic decomposition are noxious odors emanating from the pile.

Mixing (and thereby introducing more oxygen into) the pile stops this process and promotes aerobic decomposition, which is preferred because it is less odorous.

Contamination -- occurs when any material or foreign object hinders the processing of a recyclable material into a new product; commonly refers to garbage mixed in with recyclable materials, or one type of recyclable material mixed in with another recyclable material.

Diversion rate -- the percentage of all waste generated in a park that is "diverted" from the park's disposal facility into a recycling or composting program.

Drop-off facility -- a facility where the public or businesses can drop off recyclables; for a park, a single drop-off facility is typically cheaper (but less convenient) than some type of collection arrangement whereby a contractor picks up the material(s) from collection bins located around the park.

Dumpster -- a collection container designed to hold a large quantity of trash or recyclables. Volume is typically measured in terms of cubic yards of material.

Environmentally preferable -- refers to products or services that have a lesser or reduced negative effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

MMP -- Maintenance Management Program, an NPS computerized tracking system that records labor and equipment utilization for different tasks. (Formerly known as MMS.)

MRF -- materials recovery facility, a processing facility designed to sort recyclable materials and prepare them according to market specifications.

Packer truck -- a collection vehicle with a hydraulic arm that compacts the trash to allow the truck to hold more material.

Pathogen -- Any organism capable of producing infection or disease; often found in waste

materials. In a composting operation, pathogens can be effectively managed by maintaining a consistently high temperature in the compost pile (usually over 131° F for three consecutive days).

Postconsumer material -- a material or finished product that has served its intended use and has been discarded for disposal or recovery. Postconsumer material is a subset of the broader category of "recovered" material.

Recovered materials -- waste materials and by-products that have been recovered or diverted from solid waste. This term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.

Recycling -- the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Toter -- technically a brand name, this term is often used generically to refer to a heavy-duty plastic-wheeled cart that holds 68 or 96 gallons of material.

Transfer station -- a facility where trash is transferred from smaller collection vehicles into larger containers (usually large trailers) for transport to a disposal facility. These trailers are typically cheaper to transport over long distances than small collection vehicles or packer trucks.

Waste prevention -- also known as source reduction, refers to any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they become municipal solid waste. Waste prevention also refers to the reuse of products or materials.

Waste reduction -- preventing or decreasing waste generated through prevention, recycling, composting, or purchasing recycled and environmentally preferable products.

Waste sort -- also known as a waste composition analysis. Any effort to physically separate and determine the percentage composition of each material (glass, aluminum, etc.) found in the waste stream. Composition is usually calculated by weight.

Appendix B: Trade Organizations, Publications, and References

General Information

(Note: A "\$" by the title indicates a fee is charged for this publication.)

Implementing the Requirements of Executive Order 12873: A Practical Guide for Government Agencies

Federal Environmental Executive
U.S. EPA Mail Code 1600
401 M St. SW
Washington, D.C. 20460
202-260-1297

Decisionmakers Guide to Solid Waste (530-SW-89-072)

U.S. EPA
RCRA Hotline 800-424-9346

Guiding Principles of Sustainable Design (\$)

NPS Denver Service Center
303-969-2130

Department of the Interior Guidance on Pollution Prevention, Right-to-Know, Recycling, and Green Acquisition (September 1995)

USDOJ Office of Environmental Policy and Compliance, Solid and Hazardous Materials Management Team
202-208-7884

Trade Periodicals

BioCycle -- Journal of Composting and Recycling
419 State Ave.
Emmaus, PA 18049
610-967-4135

Composting News

8383 Mentor Ave.
Suite 102
Mentor, OH 44060
216-255-1454

MSW Management

5638 Hollister #301
Santa Barbara, CA 93117
805-681-1300

Recycling Times

4301 Connecticut Ave. NW
Washington, D.C. 20008
202-244-4700

Recycling Today

4012 Bridge Avenue
Cleveland, OH 44113
216-961-4130

Resource Recycling

P.O. Box 10540
Portland, OR 97210
503-227-1319

Waste Age

4301 Connecticut Ave. NW
Washington, D.C. 20008
202-244-4700

Waste News

1725 Merriman Rd.
Akron, OH 44313
216-836-9180

World Wastes

6255 Barfield Road
Atlanta, GA 30328

Source Reduction

Technical Assistance and Information

U.S. EPA WasteWiSe program
800-EPA-WISE

"Green" Hotels Association
PO Box 420212
Houston, TX 77242-0212
713-789-8889

American Hotel & Motel Assoc.
1201 New York Ave. N.W.
Suite 600
Washington, D.C. 20005
202-289-3100

How-to Manuals

Business Guide for Reducing Solid Waste (530-K-92-004)
U.S. EPA
RCRA Hotline 800-424-9346

Workplace Waste Reduction Guide (\$)

President's Commission on Environmental Quality
c/o Recycled Paper Company
12 Channel St.
Boston, MA 02210
800-886-9901

Waste Prevention Tools at Work (\$)

Cornell Waste Management Inst.
PO Box 6786
Ithaca, NY 14851
607-255-2080

No Room for Waste: A Waste Reduction and Recycling Guide for San Francisco Hotels (\$) and

Food for Thought: A Waste Reduction and Recycling Guide for San Francisco Restaurants (\$) San Francisco Recycling Program
1145 Market St. Suite 401
San Francisco, CA 94103
415-554-3412

Eat, Drink, and Recycle: A Guide to Recycling for Restaurants, Bars and Clubs (\$) Greater Chicago Recycling Industry Council
407 S. Dearborn Suite 1775
Chicago, IL 60605

Recycling and Source Reduction for the Lodging Industry (\$) American Hotel & Motel Association
301-705-7455 (to order the handbook directly)

Recycling

Most state environmental or solid waste agencies have information on recycling markets in your state. Contact them or your state recycling association for more information.

Trade Associations

National Recycling Coalition
1727 King St. Suite 105
Alexandria, VA 22314-2720
703-683-9025

National Solid Waste Management Association
4301 Connecticut Ave. NW
Suite 300
Washington, D.C. 20036
202-659-4613

America's Plastics Council
1275 K St. NW Suite 500
Washington, D.C. 20005
202-371-5334

American Forest & Paper Assoc.
1111 19th St. NW
Washington, D.C. 20036
202-463-5155

Aseptic Packaging Council
1225 Eye St. NW Suite 500
Washington, D.C. 20005
202-333-5900

Glass Packaging Institute
1801 K St. NW
Suite 800
Washington, D.C. 20006
202-887-4850

Steel Recycling Institute
Foster Plaza 10
680 Anderson Dr.
Pittsburgh, PA 15220
412-922-2772

Publications

Recycling Handbook for Recreational Areas: Case Studies from Seven National Parks
Dow Chemical
contact PFMD/WASO
202-343-7040

Composting

Trade Associations

The Composting Council
114 South Pitt St.
Alexandria, VA 22314
703-739-2401

Publications

Worms Eat My Garbage
by Mary Appelhof
Flower Press
10332 Shaver Rd.
Kalamazoo, MI 49002

Pack-In/Pack-Out

(State agency contacts)

Maine Department of
Conservation 207-287-3825

Maryland Department of Forests
and Parks
410-974-3771

Massachusetts Department of
Environmental Management
(Division of Forests and Parks)
617-727-3180 x 624

Michigan Parks Division
517-373-1270

New Hampshire State Parks
603-271-3556

Pennsylvania Bureau of State
Parks 717-787-6640

Special Waste Materials

Trade Associations

Institute of Scrap Recycling Industries
1325 G St. N.W. Suite 1000
Washington, D.C. 20005
202-662-8527

National Wooden Pallet and Container Association
1800 N. Kent St. Suite 911
Arlington, VA 22209
703-527-7667

Portable Rechargeable Battery Association
1000 Packwood Cir. Suite 430
Atlanta, GA 30339
404-612-8826

Scrap Tire Management Council
1400 K St. N.W. Suite 900
Washington, D.C. 20005
202-408-7783

Publications

NPS Hazardous Waste Manager's Guide and Pollution Prevention and Community Right-to-Know Training Manual
contact PFMD/WASO
202-343-7040

Affirmative Procurement

Publications

Environmental Procurement Strategy: EPA's Action Plan for Implementing Executive Order 12873 on Federal Acquisition, Recycling, and Waste Prevention.
August 1995. Document # EPA200-R-95-001. To obtain a copy, contact: (202) 260-4600

GSA Environmental Products Guide
Centralized Mailing List Service
PO Box 6477
Ft. Worth, TX 76115
817-334-5387

Buy Recycled Training Manual -- A Guidebook for Government Buyers and Using Agencies
N.E. Maryland Waste Disposal Authority
25 S. Charles St. Suite 2105
Baltimore, MD 21201
410-333-2730

Clean Washington Center Recycled Product Directory and Clean Washington Center's Directory of Recycled Content Building and Construction Products
Dept. of Trade & Economic Development
2001 6th Ave. Suite 2700
Seattle, WA 98121
206-587-5520

A Guide to Recycled Products
Metro Solid Waste Dept.
600 NE Grand Ave.
Portland, OR 97232
503-797-1650

Appendix C:**ISWAP Waste Diversion Worksheet**
(all figures in pounds)

Name of Facility:

12 mo. period covered:

| Type of Waste Material | Amount of Material Collected by Private Contractor | | Amount of Material Collected by NPS Crews | | Total Recyclables | Total Trash |
|----------------------------------------------------|----------------------------------------------------|---|-------------------------------------------|---|-------------------|-------------|
| Trash | | + | | = | | |
| Recycled -- metals | | + | | = | | |
| Recycled -- plastics | | + | | = | | |
| Recycled -- glass | | + | | = | | |
| Recycled -- paper & cardboard | | + | | = | | |
| Composted/chipped -- yard waste/ tree limbs/ grass | | + | | = | | |
| Composted -- manure | | + | | = | | |
| Composted -- food waste | | + | | = | | |
| Composted -- sewage/sludge | | + | | = | | |

Total =

Total Recyclables Total Trash

A

B

Waste diversion formula =

$$\frac{\text{Box A (Total Recyclables)}}{[\text{Box A (Total Recyclables)} + \text{Box B (Total Trash)}]}$$

Total waste diversion

List Other Special Wastes Recovered by the Park: (Note: Do not use them in above calculations)

Appendix D: **Basic Elements of an ISWAP Plan**

To ensure uniformity in the information included in an ISWAP plan, parks are encouraged to use the plan outline on the next page. Note that the source of information listed in the table may not be the most appropriate for every park.

Essentially, the plan should incorporate information on the following topics:

- Thorough description of the park's and concessioner's current solid waste program.
- Tonnage or volume information of both trash and recyclables should be included.
- Breakdown of the costs associated with each element of the park's solid waste program.
- Potential influences on the program, such as changes in visitation, regulatory changes, etc.
- A description of any state or local recycling or waste prevention requirements, and whether the park's own performance goals exceed those established by PFMD/WASO.
- A description and evaluation of alternative program options, along with the park's recommendations on what, if any, changes should be made to its program in the future.
- A description of the resources required to help the park implement its recommendations and achieve its programmatic goals.
- An implementation schedule, and a description of which individuals or units in the park will be responsible for different elements of the plan.

| | Required Element | Source of Information |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 1 | Description of current solid waste management practices | |
| | a) Waste generation levels (total tonnage and estimated/actual breakdown by material) | a) Div. of Maintenance/weight slips/hauler |
| | b) Waste composition (estimated/actual breakdown by material, description of how this breakdown was developed) | b) Div. of Maintenance/hauler |
| | c) Description of current trash collection system <ul style="list-style-type: none"> -- frequency of collection (mention any seasonal differences) -- staffing (mention any seasonal differences) -- vehicle type and age -- description of trash containers (dumpsters, etc.) | c) Div. of Maintenance |
| | d) Description of waste prevention efforts in the park <ul style="list-style-type: none"> -- visitor initiatives -- NPS operations initiatives -- employee housing initiatives -- concessioner initiatives (mandated and voluntary) -- whether these efforts have resulted in any measurable difference in overall solid waste levels | d) NPS staff |
| | e) Description of park's recycling program <ul style="list-style-type: none"> -- materials collected from each user group (visitors, NPS, concessioners, etc.), location of services around the park (NPS offices, visitor center, etc.) -- tonnage levels/diversion rates (by material, such as white paper, mixed paper, #1 plastics, etc.) -- description of containers/collection system (toters, etc.) -- commingled vs. source separated collection | e) Div. of Maintenance/hauler |
| | f) Description of composting efforts <ul style="list-style-type: none"> -- materials composted -- tonnage/cubic yard estimates -- collection strategies -- composting system description (windrows, etc.) | f) Concessioners |
| | g) Disposal practices <ul style="list-style-type: none"> -- name of landfill/incinerator used -- expected lifespan (plus transition schedule if less than 5 years) -- regulations applied to disposal (yard waste bans, etc.) -- alternate disposal capacity in region | g) Div. of Maintenance/haulers/state/local government |
| | h) Concessioners <ul style="list-style-type: none"> -- trash collection & hauling system -- recycling/composting/source reduction efforts -- tonnage estimates (trash & recyclables) -- diversion rate | h) Concessioners |

| | | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Cost of each element of solid waste program a) Labor b) Equipment c) Contracts | a) Div. of Maintenance/MMP b) Div. of Maintenance/MMP c) Solid waste contract/weight slips |
| 3 | Potential influences on the solid waste program a) Visitation forecasts b) Local/state/federal regulations affecting program c) Other | a) Park management plan, other planning documents b) EPA/local/state government |
| 4 | Program goals a) What they are b) How and why goals were developed, consistency w/ ISWAP goals -- mandatory state/local requirements -- target for concessioners c) Materials collected (if different from current) d) Locations served (if different from current) e) Diversion rates (if different from current) | a) Superintendent/Div. of Maintenance b) same c) same d) same e) same |
| 5 | Evaluation of options a) Describe alternative program options considered. Include: -- cost estimates (capital, labor, contracts) of each option -- impact on total program cost -- estimated impact on waste diversion b) Justification of why preferred option was selected | a) Div. of Maintenance/local haulers/other government agencies b) Superintendent/Div. of Maintenance |
| 6 | Resources needed to achieve goals a) Personnel and equipment requirements (note how these differ from the park's current situation) b) Projected program costs (note how these differ from the park's current situation) c) Management unit responsibilities | a) Div. of Maintenance/contract officer b) Div. of Maintenance/contract officer/facility operator/hauler/recycler c) Superintendent |
| 7 | Implementation schedule | Superintendent/Div. of Maintenance |

Appendix E: Material Conversion Tables

For both planning and reporting purposes, it helps to have an estimate of the weight of the materials generated in the park. The following estimates show how common volume measures convert into tonnage.

| Material | | Uncompacted material | Compacted material |
|----------------------|----------------------------|--------------------------------------------------------------|--------------------|
| | | | 720-1000 lbs/CY |
| | Corrugated Cardboard | 50-150 lbs/CY | 300-500 lbs/CY |
| | Computer Paper | 655 lbs/CY | 1310 lbs/CY |
| | Office Paper | 380 lbs/CY 96 gal totter = 250 lbs 33 gal bag = 20 lbs | 755 lbs/CY |
| Glass | | 500-700 lbs/CY | 1800-2700 lbs/CY |
| Metal | Aluminum Cans | 50-75 lbs/CY | 250-430 lbs/CY |
| | Steel Cans | 150 lbs/CY | 850 lbs/CY |
| Plastic | | 40-60 lbs/CY | 600-700 lbs/CY |
| Organic Waste | Leaves (dry & uncomposted) | 200-250 lbs/CY | 300-450 lbs/CY |
| | Grass Clippings | 350-450 lbs/CY | 550-1500 lbs/CY |
| | Horse manure | 1200 lbs/CY | --- |
| Trash | | 250 lbs/CY 30 gal. bag = 20 lbs | --- |

Sources: *Business Guide for Reducing Solid Waste*, EPA, 1993; New Jersey DEP; and Yosemite National Park estimates.

Appendix F: **Executive Order 12873** **(Federal Acquisition, Recycling, and Waste Prevention)**

EXECUTIVE ORDER 12873 OF OCTOBER 20, 1993 **FEDERAL ACQUISITION, RECYCLING, AND WASTE PREVENTION** **(As amended March 25, 1996)**

WHEREAS, the Nation's interest is served when the Federal Government can make more efficient use of natural resources by maximizing recycling and preventing waste whenever possible;

WHEREAS, this administration is determined to strengthen the role of the Federal Government as an enlightened, environmentally conscious and concerned consumer;

WHEREAS, the Federal Government should-through cost-effective waste prevention and recycling activities-work to conserve disposal capacity, and serve as a model in this regard for private and other public institutions; and

WHEREAS, the use of recycled and environmentally preferable products and services by the Federal Government can spur private sector development of new technologies and use of such products, thereby creating business and employment opportunities and enhancing regional and local economies and the national economy;

NOW, THEREFORE I, WILLIAM J. CLINTON, by the authority vested in me as President by the Constitution and the laws of the United States of America, including the Solid Waste Disposal Act, Public Law 89-272, 79 Stat. 997, as amended by the Resource Conservation and Recovery Act ("RCRA"), Public Law 94-580, 90 Stat. 2795 as amended (42 U.S.C. 6901-6907), and section 301 of title 3, United States Code, hereby order as follows:

PART 1-PREAMBLE

Section 101. Consistent with the demands of efficiency and cost effectiveness, the head of each Executive agency shall incorporate waste prevention and recycling in the Agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products.

Sec. 102. Consistent with policies established by Office of Federal Procurement Policy ("OFPP") Policy Letter 92-4, agencies shall comply with executive branch policies for the acquisition and use of environmentally preferable products and services and implement cost-effective procurement preference

programs favoring the purchase of these products and services.

Sec. 103. This order creates a Federal Environmental Executive and establishes high-level Environmental Executive positions within each agency to be responsible for expediting the implementation of this order and statutes that pertain to this order.

PART 2-DEFINITIONS

For purposes of this order:

Sec 201. "Environmentally preferable" means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

Sec. 202. "Executive agency" or "agency" means an Executive agency as defined in 5 U.S.C 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102, are covered under the auspices of the Department of Defense.

Sec. 203. "Postconsumer material" means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. "Postconsumer material" is a part of the broader category of "recovered material".

Sec. 204. "Acquisition" means the acquiring by contract with appropriated funds for supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration and those technical and management functions directly related to the process of fulfilling agency needs by contract.

Sec. 205. "Recovered materials" means waste materials and by-products which have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process (42 U.S.C. 6903 (19)).

Sec 206. "Recyclability" means the ability of a product or material to be recovered from, or otherwise diverted from, the solid waste stream for the purpose of recycling.

Sec. 207. "Recycling" means the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Sec. 208. "Waste prevention," also known as "source reduction," means any change in the design,

manufacturing, purchase or use of materials or products (including packaging) to reduce their amount or toxicity before they become municipal solid waste. Waste prevention also refers to the reuse of products or materials.

Sec. 209. "Waste reduction" means preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

Sec 210. "Life Cycle Cost" means the amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs and disposal costs discounted over the lifetime of the product.

Sec. 211. "Life Cycle Analysis" means the comprehensive examination of a product's environmental and economic effects throughout its lifetime including new material extraction, transportation, manufacturing, use, and disposal.

PART 3-THE ROLE OF THE FEDERAL ENVIRONMENTAL EXECUTIVE AND AGENCY ENVIRONMENTAL EXECUTIVES.

Sec. 301. Federal Environmental Executive. (a) A Federal Environmental Executive shall be designated by the President and shall be located within the Environmental Protection Agency ("EPA"). The Federal Environmental Executive shall take all actions necessary to ensure that the agencies comply with the requirements of this order and shall generate an annual report to the Office of Management and Budget ("OMB"), at the time of agency budget submissions, on the actions taken by the agencies to comply with the requirements of this order. In carrying out his or her functions, the Federal Environmental Executive shall consult with the Chairman of the Council on Environmental Quality.

(b) Staffing. A minimum of four (4) full time staff persons are to be provided by the agencies listed below to assist the Federal Environmental Executive, one of whom shall have experience in specification review and program requirements, one of whom shall have experience in procurement practices, and one of whom shall have experience in solid waste prevention and recycling. These four staff persons shall be appointed and replaced as follows:

- (1) a representative from the Department of Defense shall be detailed for not less than one year and no more than two years;
- (2) a representative from the General Service Administration ("GSA") shall be detailed for not less than one year and no more than two years;
- (3) a representative from EPA shall be detailed for not less than one year and no more than two years; and
- (4) a representative from one other agency determined by the Federal Environmental Executive shall be detailed on a rotational basis for not more than one year.

- (c) **Administration.** Agencies are requested to make their services, personnel and facilities available to the Federal Environmental Executive to the maximum extent practicable for the performance of functions under this order.
- (d) **Committees and Work groups.** The Federal Environmental Executive shall establish committees and work groups to identify, assess, and recommend actions to be taken to fulfill the goals, responsibilities, and initiatives of the Federal Environmental Executive. As these committees and work groups are created, agencies are requested to designate appropriate personnel in the areas of procurement and acquisition, standards and specifications, electronic commerce, facilities management, waste prevention, and recycling, and others as needed to staff and work on the initiatives of the Executive.
- (e) **Duties.** The Federal Environmental Executive, in consultation with the Agency Environmental Executives, shall:
 - (1) identify and recommended initiatives for government-wide implementation that will promote the purposes of this order, including:
 - (A) the development of a federal plan for agency implementation of this order and appropriate incentives to encourage the acquisition of recycled and environmentally preferable products by the Federal Government;
 - (B) the development of a federal implementation plan and guidance for instituting economically efficient federal waste prevention, energy and water efficiency programs, and recycling programs within each agency; and
 - (C) the development of a plan for making maximum use of available funding assistance programs;
 - (2) collect and disseminate information electronically concerning methods to reduce waste, materials that can be recycled, costs and savings associated with waste prevention and recycling, and current market sources of products that are environmentally preferable or produced with recovered materials;
 - (3) provide guidance and assistance to the agencies in setting up and reporting on agency programs and monitoring their effectiveness; and
 - (4) coordinate appropriate government-wide education and training programs for agencies.

Sec 302. Agency Environmental Executives. Within 90 days after the effective date of this order, the head of each Executive department and major procuring agency shall designate an Agency Environmental Executive from among his or her staff, who serves at a level no lower than at the Deputy Assistant Secretary level or equivalent. The Agency Environmental Executive will be responsible for:

- (a) coordinating all environmental programs in the areas of procurement and acquisition, standards and specification review, facilities management, waste prevention and recycling, and logistics;
- (b) participating in the interagency development of a Federal plan to:
 - (1) Create an awareness and outreach program for the private sector to facilitate markets for environmentally preferable and recycled products and services, promote new technologies, improve awareness about federal efforts in this area, and expedite agency efforts to procure new products identified under this order;
 - (2) establish incentives, provide guidance and coordinate appropriate educational programs for agency employees; and
 - (3) coordinate the development of standard agency reports required by this order;
- (c) reviewing agency programs and acquisitions to ensure compliance with this order.

PART 4-ACQUISITION PLANNING AND AFFIRMATIVE PROCUREMENT PROGRAMS

Sec. 401. Acquisition Planning. In developing plans, drawings, work statements, specifications, or other product descriptions, agencies shall consider the following factors; elimination of virgin material requirements; use of recovered materials; reuse of product; life cycle cost; recyclability; use of environmentally preferable products; waste prevention (including toxicity reduction or elimination); and ultimate disposal, as appropriate. These factors should be considered in acquisition planning for all procurements and in the evaluation and award of contracts, as appropriate. Program and acquisition managers should take an active role in these activities.

Sec. 402. Affirmative Procurement Programs. The head of each Executive agency shall develop and implement affirmative procurement programs in accordance with RCRA section 6002 (42 U.S.C. 6962) and this order. Agencies shall ensure that responsibilities for preparation, implementation and monitoring of affirmative procurement programs are shared between the program personnel and procurement personnel. For the purposes of all purchases made pursuant to this order, EPA, in consultation with such other Federal agencies as appropriate, shall endeavor to maximize environmental benefits, consistent with price, performance and availability considerations, and shall adjust bid solicitation guidelines as necessary in order to accomplish this goal.

- (a) Agencies shall establish affirmative procurement programs for all designated EPA guideline items purchased by their agency. For newly designated items, agencies shall revise their internal programs within one year from the date EPA designated the new items.
- (b) For the currently designated EPA guideline items, which are: (i) concrete and cement

containing fly ash; (ii) recycled paper products; (iii) re-refined lubricating oil; (iv) retread tires; and (v) insulation containing recovered materials; and for all future guidelines items, agencies shall ensure that their affirmative procurement programs require that 100 percent of their purchases of products meet or exceed the EPA guideline standards unless written justification is provided that a product is not available competitively within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price.

- (c) The Agency Environmental Executives will track agencies' purchases of designated EPA guideline items and report agencies' purchases of such guideline items to the Federal Environmental Executive. Agency Environmental Executives will be required to justify to the Federal Environmental Executive as to why the item(s) have not been purchased or submit a plan for how the agencies intend to increase their purchase of the designated item(s).
- (d) Agency affirmative procurement programs, to the maximum extent practicable, shall encourage that:
 - (1) documents be transferred electronically,
 - (2) all government documents printed internally be printed double-sided, and
 - (3) contracts, grants, and cooperative agreements issued after the effective date of this order include provisions that require documents to be printed double-sided on recycled paper meeting or exceeding the standards established in this order or in future EPA guidelines.

Sec. 403. Procurement of Existing Guideline Items. Within 90 days after the effective date of this order, the head of each Executive agency that has not implemented an affirmative procurement program shall ensure that the affirmative procurement program has been established and is being implemented to the maximum extent practicable.

Sec. 404. Electronic Acquisition System. To reduce waste by eliminating unnecessary paper transactions in the acquisition process and to foster accurate data collection and reporting of agencies' purchases of recycled content and environmentally preferred products, the executive branch will implement an electronic commerce system consistent with the recommendations adopted as a result of the National Performance Review.

PART 5 -- STANDARDS, SPECIFICATIONS AND DESIGNATION OF ITEMS

Sec. 501. Specifications, Product Descriptions and Standards. Where applicable, Executive agencies shall review and revise federal and military specifications, products descriptions and standards to enhance Federal procurement of products made from recovered materials or that are environmentally preferable. When converting to a Commercial Item Description (CID), agencies shall ensure that environmental factors have been considered and that the CID meets or exceeds the

environmentally preferable criteria of the government specification or product description. Agencies shall report annually on their compliance with this section to the Federal Environmental Executive for incorporation into the annual report to OMB referred to in section 301 of this order.

- (a) If an inconsistency with RCRA Section 6002 or this order is identified in a specification, standard, or product description, the Federal Environmental Executive shall request that the Environmental Executive of the pertinent agency advise the Federal Environmental Executive as to why the specification cannot be revised or submit a plan for revising it within 60 days.
- (b) If an agency is able to revise an inconsistent specification but cannot do so within 60 days, it is the responsibility of that agency's Environmental Executive to monitor and implement the plan for revising it.

Sec. 502. Designation of Items that Contain Recovered Materials. In order to expedite the process of designating items that are or can be made with recovered materials, EPA shall institute a new process for designating these items in accordance with RCRA section 6002(a) as follows. (a) EPA shall issue a Comprehensive Procurement Guideline containing designated items that are or can be made with recovered materials.

- (1) The proposed guideline shall be published for public comment in the Federal Register within 180 days after the effective date of this order and shall be updated annually after publication for comment to include additional items.
- (2) Once items containing recovered materials have been designated by EPA through the new process established pursuant to this section and in compliance with RCRA section 6002, agencies shall modify their affirmative procurement programs to require that, to the maximum extent practicable, their purchases of products meet or exceed the EPA guideline standards unless written justification is provided that a product is not available competitively, not available within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price.
- (b) Concurrent with the issuance of the Comprehensive Procurement Guideline required by section 502(a) of this order, EPA shall publish for public comment in the Federal Register Recovered Material Advisory Notice(s) that present the range of recovered material content levels within which the designated recycled items are currently available. These levels shall be updated periodically after publication for comment to reflect changes in market conditions.

Sec. 502. Guidance for Environmentally Preferable Products. In accordance with this order, EPA shall issue guidance that recommends principles that Executive agencies should use in making determinations for the preference and purchase of environmentally preferable products.

- (a) Proposed guidance shall be published for public comment in the Federal Register within 180

days after the effective date of this order, and may be updated after public comment, as necessary, thereafter. To the extent necessary, EPA may issue additional guidance for public comment on how the principles can be applied to specific product categories.

- (b) Once final guidance for environmentally preferable products has been issued by EPA, Executive agencies shall use these principles, to the maximum extent practicable, in identifying and purchasing environmentally preferable products and shall modify their procurement programs by reviewing and revising specifications, solicitation procedures, and policies as appropriate.

Sec. 504. Minimum Content Standard for Printing and Writing Paper. Executive agency heads shall ensure that agencies shall meet or exceed the following minimum materials content standards when purchasing or causing the purchase of printing and writing paper:

- (a) For high speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white woven envelopes and for other uncoated printing and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock, the minimum content standard shall be no less than 20 percent postconsumer materials beginning December 31, 1994. This minimum content standard shall be increased to 30 percent beginning on December 31, 1998.
- (b) As an alternative to meeting the standards in sections 504(a), for all printing and writing papers, the minimum content standard shall be no less than 50 percent recovered materials that are a waste material byproduct of a finished product other than a paper or textile product which would otherwise be disposed of in a landfill, as determined by the State in which the facility is located.
 - (1) The decision not to procure recycled content printing and writing paper meeting the standards specified in this section shall be based solely on a determination by the contracting officer that a satisfactory level of competition does not exist, that the items are not available within a reasonable time period, or that the available items fails to meet reasonable performance standards established by the agency or are only available at an unreasonable price.
 - (2) Each agency should implement waste prevention techniques, as specified in section 402(d) of this order, so that total annual expenditures for recycled content printing and writing paper do not exceed current annual budgets for paper products as measured by average annual expenditures, adjusted for inflation based on the Consumer Price Index or other suitable indices. In determining a target budget for printing and writing paper, agencies may take into account such factors as employee increases or decreases, new agency or statutory initiatives, and episodic or unique requirements (e.g., census).
 - (3) Effective immediately, all agencies making solicitations for the purchase of printing and

writing paper shall seek bids for paper with postconsumer material or recovered waste material as described in section 504(c).

Sec. 505. Revision of Brightness Specifications and Standards. The General Services Administration and other Federal agencies are directed to identify, evaluate and revise or eliminate any standards or specifications unrelated to performance that present barriers to the purchase of paper or paper products made by production processes that minimize emissions of harmful byproducts. This evaluation shall include a review of unnecessary brightness and stock clause provisions, such as lignin content and chemical pulp requirements. The GSA shall complete the review and revision of such specifications within six months after the effective date of this order, and shall consult closely with the Joint Committee on Printing during such process. The GSA shall also compile any information or market studies that may be necessary to accomplish the objectives of this provision.

Sec. 508. Procurement of Re-refined Lubricating Oil and Retread Tires. Within 180 days after the effective date of this order, agencies shall implement the EPA procurement guidelines for re-refined lubricating oil and retread tires.

- (a) Commodity managers shall finalize revisions to specifications for re-refined oil and retread tires, and develop and issue specifications for tire retreading services, as commodity managers shall take affirmative steps to procure these items in accordance with RCRA section 6002.
- (b) Once these items become available, fleet managers shall take affirmative steps to procure these items in accordance with RCRA section 6002.

Sec. 507. Product Testing. The Secretary of Commerce, through the National Institute of Standards and Technology ("NIST"), shall establish a program for testing the performance of products containing recovered materials or deemed to be environmentally preferable. NIST shall work with EPA, GSA and other public and private sector organizations that conduct appropriate life cycle analyses to gather information that will assist agencies in making selections of products and services that are environmentally preferable.

- (a) NIST shall publish appropriate reports describing testing programs, their results, and recommendations for testing methods and related specifications for use by Executive agencies and other interested parties.
- (b) NIST shall coordinate with other Executive and State agencies to avoid duplication with existing testing programs.

PART 6 -- AGENCY GOALS AND REPORTING REQUIREMENTS

Sec. 601. Goals for Waste Reduction. Each agency shall establish a goal for solid waste prevention and a goal for recycling to be achieved by the year 1995. These goals shall be submitted to the Federal

Environmental Executive within 180 days after the effective date of this order. Progress on attaining these goals shall be reported by the agencies to the Federal Environmental Executive for the annual report specified in section 301 of this order.

Sec. 602. Goal for Increasing the Procurement of Recycled and Other Environmentally Preferable Products. Agencies shall strive to increase the procurement of products that are environmentally preferable or that are made with recovered materials and set annual goals to maximize the number of recycled products purchased, relative to non-recycled alternatives.

Sec. 603. Review of Implementation. The President's Council on Integrity and Efficiency ("PCIE") will request that the Inspector General periodically review agencies' affirmative procurement programs and reporting procedures to ensure their compliance with this order.

PART 7 – APPLICABILITY AND OTHER REQUIREMENTS

Sec. 701. Contractor Operated Facilities. Contracts that provide for contractor operation of a government-owned or leased facility, awarded after the effective date of this order, shall include provisions that obligate the contractor to comply with the requirements of this order within the scope of its operations. In addition, to the extent permitted by law and where economically feasible, existing contracts should be modified.

Sec. 702. Real Property Acquisition and Management. Within 90 days after the effective date of this order, and to the extent permitted by law and where economically feasible, Executive agencies shall ensure compliance with the provisions of this order in the acquisition and management of federally owned and leased space. GSA and other Executive agencies shall also include environmental and recycling provisions in the acquisition of all leased space and in the construction of new federal buildings.

Sec. 703. Retention of Funds. Within 90 days after the effective date of this order, the Administrator of GSA shall develop a legislative proposal providing authority for Executive agencies to retain a share of the proceeds from the sale of materials recovered through recycling or waste prevention programs and specifying the eligibility requirements for the materials being recycled.

Sec. 704. Model Facility Programs. Each Executive department and major procuring agency shall establish model facility demonstration programs that include comprehensive waste prevention and recycling programs and emphasize the procurement of recycled and environmentally preferable products and services using an electronic data interchange (EDI) system.

Sec. 705. Recycling Programs. Each Executive agency that has not already done so shall initiate a program to promote cost effective waste prevention and recycling of reusable materials in all of its facilities. The recycling programs implemented pursuant to this section must be compatible with applicable State and local recycling requirements. Federal agencies shall also consider cooperative ventures with State and local governments to promote recycling and waste reduction in the community.

PART 8 -- AWARENESS

Sec. 801. Agency Awards Program. A government-wide award will be presented annually by the White House to the best, most innovative program implementing the objectives of this order to give greater visibility to these efforts so that they can be incorporated government-wide.

Sec. 802. Internal Agency Awards Programs. Each agency shall develop an internal agency-wide awards program, as appropriate, to reward its most innovative environmental programs. Winners of agency-wide awards will be eligible for the White House award program.

PART 9 -- REVOCATION, LIMITATION AND IMPLEMENTATION

Sec. 901. Executive Order No. 12780, dated October 31, 1991, is hereby revoked.

Sec. 902. This order is intended only to improve the internal management of the executive branch and is not intended to create any right or benefit, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or any other person.

Sec. 903. The policies expressed in this order, including the requirements and elements for effective agency affirmative procurement programs, shall be implemented and incorporated in the Federal Acquisition Regulation (FAR) within 180 days after the effective date of this order. The implementation language shall consist of providing specific direction and guidance on agency programs for preference, promotion, estimation, certification, reviewing and monitoring.

Sec. 904. This order shall be effective immediately.

Appendix G: **Beverage Container Deposit Requirements** **(NPS 48 and 40 CFR Part 244)**

NPS-48 **CONCESSIONS GUIDELINE**

A. SALES OR USE TAX

1. Law, Regulation, Policy

a.

4 U.S.C. 105

....State or taxing authority shall have full jurisdiction and power to levy and collect any such tax in any Federal area within such State to the same extent and with the same effect as though such area was not a Federal area.

b. REGULATION

None

POLICY

See law above.

B. BEVERAGE CONTAINER PROGRAM

1 Law

P.L. 89-272 Solid Waste Disposal Act, October 20, 1965 as amended by P.L. 91-512, Resource Recovery Act October 26, 1970 (Section 211), 42 U.S.C. §3251-3259 Executive Order 11752

If an Executive Agency ... has jurisdiction over any real property or facility the operation or administration of which involves such agency in solid waste disposal activities or such an

agency enters into a contract with any person for the operation ... of any Federal property or facility, and the performance of such contract involves such person in solid waste disposal activities, then such agency shall insure compliance with the guidelines recommended under section 209 and the purpose of this Act in the operation or administration of such property of facility, or the performance of such contract

2. Regulation

40 CFR Part 244 Solid Waste Management Guidelines for Beverage Containers.

Sec. 244.100 SCOPE

- (b) Section 211 of the Act and Executive Order 11752 makes the "requirements" section of the guidelines mandatory upon Federal Agencies. They are recommended for adoption by State and local governments and private agencies.
- (c) (1) These guidelines for Beverage Containers are intended to achieve a reduction in beverage container solid waste and litter, resulting in savings in waste collection and disposal costs to the Federal Government. They are also intended to achieve the conservation and more efficient use of energy and material resources through the development of effective beverage distribution and container collection systems.
 - (4) Final determination of how the requirements of the guidelines will be met rests with the head of each Federal Agency.

3 Policy

Management Policies Manual, Chapter VIII Beverage Container Program

The National Park Service encourages the saving of energy and the reduction of litter through the use of recyclable containers wherever practical. To that end, NPS has established a program for the use of returnable beverage containers for which a deposit is charged.

4. Responsibility

Park Managers/Superintendents are responsible for application of the program, subject to the procedures set forth below.

5. Procedures

a. BEVERAGE CONTAINER GUIDELINES REQUIREMENTS

- (1) All beverages in beverage containers sold or offered for sale shall be sold in

returnable beverage containers.

- (2) A deposit of at least five (5) cents shall be charged unless the local area has an established return system at a lower minimum deposit level.
- (3) The concessioner shall accept from consumers the empty beverage containers sold by that concessioner and pay the consumer the refund value of the container.
- (4) Refunds shall be provided at the place of sale (point of purchase) whenever possible or as close to that point as practical if original point is unattended.
- (5) Refillable beverage containers shall be returned to distributors for refilling and all other returnable containers shall be returned for recycling where markets for recyclable materials are available.
- (6) All beverage containers must clearly indicate by embossing, stamp, or label securely affixed to the beverage container, that the container is returnable and the refund value of the container.
- (7) Concessioner must inform consumers that beverages are sold in returnable beverage containers by placing a sign or shelf label or both at the point of purchase of the container. The sign must state that the containers are returnable, list the beverage price and deposit amount, indicate where empties may be returned for refund and show a sample of the identifying label, stamp or embossing if so marked.

b. EXCEPTIONS

It is recognized certain conditions may exist in which it may not be practical to enforce the requirements of the Beverage Container Guidelines due to geographic or logistical problems. Therefore, the program may be discontinued at the discretion of the Superintendent if one or more of the following conditions apply:

- (1) Program requires additional manpower or incurs other costs which result in its losing money.
- (2) Efforts to implement the requirements have failed to induce consumers to buy beverages in returnable containers or to return them when empty.
- (3) Impractical to establish refund location in small remote outlets where the majority of consumers are transient and it is not possible to use returnable containers effectively.
- (4) There is no market for recyclable container within a reasonable distance.

- (5) The program may not be discontinued if State or local law in the area mandates a deposit program.

Superintendents are required to report to the Regions those concession facilities exempted from the program.

Non-implementation decisions are not to be construed as a policy against environmental progress. All Superintendents and concessioners must continue to promote energy conservation and waste reduction by any means possible and continue to inform park visitors of NPS commitment in both of these areas.

c. REPORTS

Annual reports previously required for the Beverage Container Program are discontinued.

**40 CFR PART 244:
SOLID WASTE MANAGEMENT GUIDELINES
FOR BEVERAGE CONTAINERS**

Authority: Secs. 1008 and 6004 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6907, 6964).

Source: 41 FR 41203, Sept. 21, 1976, unless otherwise noted.

Subpart A – General Provisions

§244.100 Scope.

- (a) The "Requirement" sections contained herein delineate minimum actions for Federal agencies for reducing beverage container waste.
- (b) Section 211 of the Act and Executive Order 11752 make the "Requirements" section of the guidelines mandatory upon Federal agencies. They are recommended for adoption by State and local

governments and private agencies.

(c) Intent and Objectives.

- (1)** These Guidelines for Beverage Containers are intended to achieve a reduction in beverage container solid waste and litter, resulting in savings in waste collection and disposal costs to the Federal Government. They are also intended to achieve the conservation and more efficient use of energy and material resources through the development of effective beverage distribution and container collection systems.
- (2)** The guidelines are intended to achieve these goals by making all beverage containers returnable and encouraging reuse of recycling of the returned containers. To accomplish the return of beverage containers, a deposit of at least five cents on each returnable beverage container is to be paid upon purchase by the consumer and refunded to the consumer when the empty container is returned to the dealer. This refund value provides a positive incentive for consumers to return the empty containers. Once containers are returned, nonrefillable containers can be recycled and refillable bottles can be reused.
- (3)** The minimum deposit of five cents has been chosen because it is deemed a large enough incentive to induce the return of most containers, and it is the most widely used deposit amount in present deposit systems. Because this action is intended to be compatible with present deposit systems, it is recommended that Federal facilities apply higher deposit levels in localities where higher levels are ordinarily used and lower deposit levels if the local area has an established return system with a minimum deposit level, for some or all beverage containers, of less than five cents.
- (4)** Final determination of how the requirements of the guidelines will be met rests with the head of each Federal agency.
- (5)** Federal facilities implementing the guidelines must charge refundable deposits on both refillable beverage containers and nonrefillable ones. Use of a refillable beverage container system will achieve the objectives of this guideline and will also most likely result in lower beverage prices for consumers. However, placing refundable deposits on nonrefillable containers, which are subsequently returned and recycled, also achieves the objectives of the guidelines.

(d) Nonimplementation for Federal Facilities.

- (1)** The objectives of these guidelines are to reduce solid waste and litter and to conserve energy and materials through the use of a return system for beverage containers. In order to have a substantial impact on solid waste and litter created by beverage containers and to effect the concomitant energy and materials savings in a cost-effective manner, three conditions will be necessary: First, that consumers continue to purchase beverages from dealers at Federal

facilities; second, that empty containers be returned and then reused or recycled; third, that the costs of implementation are not prohibitive. The head of each agency should consider these factors in order to make a determination regarding implementation of these guidelines.

- (2) The Administrator recognizes that the requirements of these guidelines may not be practical at some Federal facilities due to geographic or logistic problems of a local nature. Further, he recognizes that the use of a returnable beverage container system will accomplish nothing if all reasonable efforts to implement such a system have failed to induce consumers to buy beverages in returnable containers or to return them when empty. When these situations persist, agencies may determine not to continue implementation of these guidelines.
- (3) Federal agencies that make the determination not to use returnable containers shall provide to the Administrator the analysis and rationale used in making that determination as required by §244.100(f)(3). The Administrator will publish notice of availability of this report in the Federal Register. The following conditions are considered to be valid reasons for not using returnable beverage containers.
 - (i) Situations in which, after a trial implementation, there is no alternative available that results in meeting the objectives of the guidelines in a cost effective manner. Examples of indications of this situation include, but are not limited to: (A) Data indicating a substantial and persistent reduction in beverage sales that is not directly attributable to any other cause; and (B) failure to establish a beverage container return rate that effectively achieves the objectives of these guidelines.
 - (ii) Situations in which no viable alternative can be found which avoids excessive, irrecoverable costs to the facility or the Agency. These conditions may prevail at either part or all of a facility. It is expected that facilities will use returnable beverage containers in those portions of their beverage distribution systems where it is effective to do so. However, it is recognized that in some situations, such as for unattended vending machines where it is impractical to establish refund locations, or in small remote outlets where the majority of consumers are transient, it may not be possible to use returnable containers effectively. The provisions for nonimplementation can be applied to those portions of a facility.
- (e) The Environmental Protection Agency will render technical assistance and other guidance to Federal agencies when requested to do so pursuant to section 3(d)(1) of Executive Order 11752.
- (f) Reports
 - (1) Implementation Schedule Report. This report is to advise the EPA of plans for the implementation of these guidelines. It is to be submitted to the Administrator within 60 days following an agency's determination to implement, and should include a list of planned implementation actions and a schedule indicating when those actions will be taken.

(2) [Reserved]

- (3) Nonimplementation Report. Nonimplementation reports are to be submitted to the Administrator as soon as possible after a final agency determination has been made not to use returnable beverage containers but not later than sixty days after this determination. The Administrator will indicate to the reporting agency his concurrence or nonconcurrence with the agency's decision, including his reasons therefor. This concurrence or nonconcurrence is advisory.

Nonimplementation reports should include:

- (i) A description of alternative actions considered or implemented, including those actions which, if taken or continued, would have involved a deposit or return system.
- (ii) A description of ongoing actions that will be continued and actions taken or proposed that would preclude future implementation of a returnable beverage container system. This statement should identify all agency facilities or categories of facilities that will be affected.
- (iii) An analysis in support of the determination not to implement a deposit system, including technical data, market studies, and policy considerations used in making that determination. If the determination not to implement is based on inability to achieve a cost-effective system, this analysis should include such things as sales volume, impact on total overhead costs, administrative costs, other costs of implementation, percentage of containers sold that are returned, solid waste and litter reduction, energy and materials saved, and retail prices (before and after implementation).

[41 FR 41203, Sept. 21, 1976, as amended at 47 FR 36602, Aug. 20, 1982]

§244.101 Definitions.

- (a) Beverage means carbonated natural or mineral waters; soda water and similar carbonated soft drinks; and beer or other carbonated malt drinks in liquid form and intended for human consumption.
- (b) Beverage container means an airtight container containing a beverage under pressure of carbonation. Cups and other open receptacles are specifically excluded from this definition.
- (c) Consumer means any person who purchases a beverage in a beverage container for final use or consumption.
- (d) Dealer means any person who engages in the sale of beverages in beverage containers to a consumer.

- (e) Deposit means the sum paid to the dealer by the consumer when beverages are purchased in returnable beverage containers, and which is refunded when the beverage container is returned.
- (f) Distributor means any person who engages in the sale of beverages, in beverage containers, to a dealer, including any manufacturer who engages in such sale.
- (g) Federal Agency means any department, agency, establishment, or instrumentality of the executive branch of the United States Government.
- (h) Federal facility means any building, installation, structure, land, or public work owned by or leased to the Federal Government. Ships at sea, aircraft in the air, land forces on maneuvers, and other mobile facilities; and United States Government installations located on foreign soil or on land outside the jurisdiction of the United States Government are not considered "Federal facilities" for the purpose of these guidelines.
- (i) On-Premise Sales means sales transactions in which beverages are purchased by a consumer for immediate consumption within the area under control of the dealer.
- (j) Recycling means the process by which recovered materials are transformed into new products.
- (k) Refillable Beverage Container means a beverage container that when returned to a distributor or bottler is refilled with a beverage and reused.
- (l) Refund means the sum, equal to the deposit, that is given to the consumer or the dealer or both in exchange for empty returnable beverage containers.
- (m) Returnable Beverage Container means a beverage container for which a deposit is paid upon purchase and for which a refund of equal value is payable upon return.

Subpart B – Requirements

§244.200 Requirements.

§244.201 Use of returnable beverage containers.

- (a) All beverages in beverage containers sold or offered for sale shall be sold in returnable beverage containers. On-premise sales are specifically excluded from this requirement provided that empty beverage containers are returned to the distributor for refilling, or are recycled, either by the dealer or by the distributor when markets for recyclable materials are available.
- (b) The deposit shall be at least five (5) cents unless the local area has an established return system in operation with a lower minimum deposit level. In these specific areas, Federal facilities may adopt a minimum deposit equal to the local deposit level.

- (c) A dealer shall accept from a consumer any empty beverage containers of the kind, size and brand sold by the dealer, and pay the consumer the refund value of the beverage container, provided the container is refillable or is labelled in accordance with §244.202(a).
- (d) The refund shall be provided at the place of sale whenever possible or as close to that place as practicable, and in any event, on the premises of the particular federal facility involved. Refund locations shall be conspicuously labelled as refund centers. If they are not in the immediate vicinity of the place of sale, notice of their location shall be prominently posted at that place of sale.
- (e) A dealer shall not procure beverages in beverage containers from distributors who refuse to: Accept from the dealer any returnable beverage containers of the kind, size and brand sold by the distributor; pay to the dealer the refund value of the beverage containers; and reuse the returned containers or recycle them where markets for recyclable materials are available.
- (f) Returned refillable beverage containers shall be returned to the distributor for refilling. Nonrefillable beverage containers shall be returned to the appropriate distributor or recycled, where markets for recyclable materials are available.

§244.202 Information.

- (a) With the exception of refillable beverage containers, every returnable beverage container sold or offered for sale by a dealer shall clearly and conspicuously indicate, by embossing or by stamp, or by a label securely affixed to the beverage container, the refund value of the container and that the container is returnable.
- (b) Dealers shall inform consumers that beverages are sold in returnable beverage containers by placing a sign, or a shelf label, or both, in close proximity to any sales display of beverages in returnable containers. That sign or label shall indicate that all containers are returnable, separately list the beverage price and deposit to be paid by the consumer, and shall indicate where the empty beverage containers may be returned for refund of the deposit.

§244.203 Implementation decisions and reporting.

Federal agencies are to determine whether or not to implement these guidelines by October 20, 1977. Reporting of that determination shall be in accordance with the following requirements:

- (a) Federal agencies that plan to implement these guidelines shall report that decision to the Administrator in accordance with the procedures described in §244.100(f)(1).
- (b) Agencies that determine not to implement these guidelines shall provide to the Administrator a nonimplementation report in accordance with §244.100(f)(3). This report shall include the reasons for nonimplementation, based on concepts presented in §244.100(d).

[47 FR 36602 Aug. 1982 FR 41959 Sept. 23 1982]

Appendix H: Tracking Recycling with MMP (Maintenance Management Program)

Note: Following is a description of the Maintenance Management Program (MMP)-based system used by some National Capital Area parks to track recycling. Although parks are encouraged to use this system as a model for their own facilities, other computerized tracking systems work equally well. Some type of tracking system, manual or computerized, should be established to provide park managers with a record of the costs of their program. Such information is vital when weighing the relative merits of different waste management approaches, or recycling alternatives.

The George Washington Memorial Parkway (GWMP) uses the MMP system to track both the amount of materials recycled in the park and the cost of the recycling program. The only real difference in tracking recycling as opposed to other maintenance activities is in units of measure: Rather than "hours," units of measure appropriate to each recyclable material are reported (pounds for metal, gallons for oil, etc.) Following is a list of the Activity Codes used by GWMP to track each material it collects, along with its suggested units of measure. Parks interested in developing their own tracking system are encouraged to use similar units of measure.

Two sample reports prepared by GWMP are shown below. For more information on the tracking system, contact Ron Vail, Facility Management Specialist/MMP Coordinator at GWMP at (703) 419-6423.

GWMP MMP Activity Codes for Recycling

| <u>Code</u> | <u>Name</u> | <u>Units</u> | <u>Code</u> | <u>Name</u> | <u>Units</u> |
|-------------|------------------------|--------------|-------------|------------------------|------------------|
| 8740 | Recycle paper products | lbs | 8760 | Recycle liquids | gal |
| 8741 | Recycle white paper | lbs | 8761 | Recycle motor oil | gal |
| 8742 | Recycle colored paper | lbs | 8762 | Recycle antifreeze | gal |
| 8743 | Recycle newsprint | lbs | 8763 | Recycle solvents | gal |
| 8744 | Recycle cardboard | lbs | 8770 | Recycle misc. | each |
| 8750 | Recycle materials | lbs | 8771 | Recycle tires | each |
| 8751 | Recycle aluminum/tin | lbs | 8772 | Recycle lead batteries | each |
| 8752 | Recycle glass | lbs | 8775 | Compost | yds ³ |
| 8753 | Recycle plastic | lbs | 8780 | Recycling activities | per hr |
| 8754 | Recycle other metals | lbs | | | |

Sample Park Performance Report

| National Park Service Maintenance Management | | PARK PERFORMANCE REPORT ¹ | | | | page: 23 Date: 02/22/96 Report Type: ACT SUM ² | | |
|-------------------------------------------------|-----------------------------------------|------------------------------------------------------------------|-------|---------|----------------------------------|-----------------------------------------------------------------|--------------------------|------|
| | | Period from 10/93 to 09/94 GEORGE WASHINGTON MEMORIAL PARKWAY | | | | | | |
| PERFORMANCE CODE | ACTIVITY NAME | PERFORMANCE INDICATOR | PLAN | ACTUAL | CURRENT MONTH PERFORMANCE PCT | PLAN | PERIOD TO DATE ACTUAL | PCT |
| 8740 | Recycle Paper Prod. LBS ³ | Person Days | 0 | 0 | 100 | 3 | 8 | 267 |
| | | Accomplishment | 185.0 | 1031.0 | 557 | 2300.0 | 12608.0 | 548 |
| | | Avg Daily Prod | 308.3 | 10310.0 | 3344 | 302.6 | 3232.8 | 1068 |
| | | Total Cost | 42 | 64 | 152 | 513 | 1092 | 213 |
| | | Unit Cost | .23 | .06 | 26 | .22 | .09 ⁴ | 41 |
| 8752 | Recycle Glass LBS | Person Days | 0 | 0 | 100 | 0 | 2 | * |
| | | Accomplishment | .0 | 80.0 | * | .0 | 380.0 | * |
| | | Avg Daily Prod | .0 | .0 | 100 | .0 | .0 | 100 |
| | | Total Cost | 0 | 16 | * | 0 | 1421 | * |
| | | Unit Cost | .00 | .20 | * | .00 | 3.74 | * |
| 8762 | Recycle Antifreeze GALS ³ | Person Days | 0 | 0 | 100 | 0 | 0 | 100 |
| | | Accomplishment | .1 | .0 | 0 | 1.0 | .0 | 0 |
| | | Avg Daily Prod | .0 | .0 | 100 | .0 | .0 | 100 |
| | | Total Cost | 0 | 0 | 100 | 0 | 0 | 100 |
| | | Unit Cost | .00 | .00 | 100 | .00 | .00 | 100 |

Explanations:

- ① This report summarizes performance and costs parkwide. Individual management units are tracked via a different set of reports. (See next page.)
- ② "Report Type: ACT SUM" refers to "activity summary." An activity summary report summarizes data collected over the designated time period for the entire park.
- ③ Note that the "unit of measure" varies by material -- pounds for paper and glass, and gallons for oil.
- ④ The per unit cost is a useful figure when comparing the existing collection system with an alternative, such as one proposed by an outside contractor. For instance, at \$0.09/lb it costs GWMP roughly \$180/ton to manage its paper products. (Calculation = \$0.09/lb. x 2,000 lbs./ton = \$180/ton).

Sample On-Screen Activity Performance Report

| ON SCREEN ACTIVITY PERFORMANCE REPORT ① | | | | | | |
|--------------------------------------------------------------|-------|--------------|------|---------|-----------------------|-----|
| PERIOD FROM 10/93 TO 09/94 MGMT UNIT: SANI ② SANITATION CREW | | | | | | |
| ACTIVITY: 8740 RECYCLE PAPER PROD. | | | | | | |
| ③ WORK UNIT: LBS INVENTORY: 1.00 RECYCLE PAPER | | | | | | |
| PERFORMANCE INDICATOR | PLAN | MONTH ACTUAL | PCT | PLAN | PERIOD TO DATE ACTUAL | PCT |
| ACCOMPLISHMENT | 100.0 | 791.0 | 791 | 1200.0 | 8973.0 | 748 |
| PERSON DAYS | 0 | 0 | 100 | 2 | 4 | 200 |
| CREW DAYS | .2 | .1 | 50 | 2.4 | 3.9 | 163 |
| AVG DAIL PROD | 500.0 | 7910.0 | 1582 | 500.0 | 2300.8 | 460 |
| LABOR COST (\$) | 28 | 17 | 61 | 341 | 422 | 124 |
| EQUIPMENT COST (\$) | 1 | 0 | 0 | 8 | 1 | 13 |
| MATRL/OTHER COST (\$) | 0 | 0 | 100 | 0 | 184 | * |
| TOTAL COST (\$) | 29 | 17 | 59 | 349 | 607 | 174 |
| UNIT COST (\$/LBS) | .29 | .02 | 7 | .29 | .07 ④ | 24 |
| COST/CREW DAY (\$) | 145 | 170 | 117 | 145 | 156 | 108 |
| SERVICE LEVEL (LBS /LB): | | | | | | |
| REQUIRED | | | | 1200.00 | | |
| PLANNED | | | | 1200.00 | | |
| ACTUAL TO DATE | | | | | 8973 | |
| F1-help F9-exit End-new selection PrtSc-print screen | | | | | | |

Explanation:

- ① The On-Screen Activity Performance Report is more detailed than the Park Performance Report, discussing performance data and labor, equipment, and material costs for an individual management unit within a park.
- ② GWMP has 15 different management units; this report tracks the performance and cost of the Sanitation Crew, which operates park-wide. Some parks track individual geographic areas within a park as a separate management unit.
- ③ The "Activity" describes which material is collected and how work units are measured. In the case of paper, work units are tracked as pounds of material collected.
- ④ The various cost figures are broken down here. The unit cost (shown here as .07) is an important figure for calculating the cost-effectiveness of the current collection strategy. In this case, it costs the park \$140/ton to have the Sanitation Crew collect paper products around the park. (Calculation = $\$0.07/\text{lb.} \times 2,000 \text{ lbs./ton} = \$140/\text{ton}$).

Appendix I: **Sample ISWAP Study:** **Rock Creek Park**

In 1994, the National Capital Area commissioned solid waste management analyses of three parks in the Washington, D.C., area: George Washington Memorial Parkway, Rock Creek Park, and Prince William Forest Park.

The following study for Rock Creek Park is intended to be used as a model of a comprehensive solid waste management study. Rock Creek will use this report as background information for its ISWAP plan, supplementing it with information on which of the recommendations were accepted, who is responsible for their implementation, and when they will be completed.

Parks with questions about information contained in this study should contact Cindy Cox (Chief of Maintenance) at Rock Creek Park (202-282-7602) or Wendy Berhman (Solid Waste Management Coordinator) at the National Capital Area System Support Office (202-619-7060).

Rock Creek Park

Integrated Solid Waste Alternatives Program Study

June 1995

**PREPARED BY
HAMMER ENVIRONMENTAL CONSULTING
RIVERDALE, NEW YORK
AND
NORTHWEST ECONOMIC CONSULTING
SEATTLE, WASHINGTON**

**Prepared as partial fulfillment of
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Rock Creek Park ISWAP Study

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Introduction

Rock Creek Park represents an anomaly in the National Park system. Located in the heart of Washington, D.C., it is truly an urban park, surrounded on all sides by residential and business areas. The park's roadways form an integral part of the transportation system in the District. But the Park also serves as an urban oasis, providing a respite for area residents looking for a convenient escape from the pace of the city.

Rock Creek's role as a "neighborhood park" and its ever-changing visitor population makes it a challenging location to pursue integrated solid waste management. This report will analyze the current solid waste management system operating within the park, review its costs, and suggest alternate waste management strategies that build on current programs. This report also describes how park managers can use their solid waste practices to help improve the environment and reinforce the Park Service's position as an environmental leader.

The scope of this report is limited to the municipal solid waste generated in the park; that is, all nonhazardous solid waste generated by Park Service operations, concessions, picnic areas, and other public areas in the park.

Chapter One: Introduction to Rock Creek Park

Until recently, Rock Creek Park was the largest National Park in an urban area. Authorized in 1890 and incorporated into the National Park system in 1890, the park contains a total of 1754 acres in the middle of Washington, D.C. The range of natural, historical, cultural and recreational resources in the park is quite remarkable, including jogging, hiking, biking and equestrian trails; athletic fields; tennis courts; numerous picnic areas; a golf course; a nature center and planetarium; a 4,000 seat outdoor theater; a boat house; flower gardens; and a number of Civil War era fortifications. [See map of park on next page.]

Most Washington area residents treat Rock Creek as a neighborhood park, much like Golden Gate Park in San Francisco or Central Park in New York City. The obvious difference is the management team -- the Federal Government administers Rock Creek rather than the local government.

Among the most popular features of Rock Creek Park are the group picnic areas, reserved by business, religious, and neighborhood groups for picnics throughout the spring, summer, and fall. A reservation system restricts use of these areas; all other facilities in the park (including twenty other designated picnic areas) are open to the public.

There are few meaningful visitation statistics for the park. Picnic area reservation figures only hint at the total number of people using the park on a daily basis. It is clear, however, that most visitation occurs during the summer months, with slightly lower numbers during the spring and fall.

Rock Creek Park has a permanent staff of approximately 100 employees, and supplements this team with 30-35 seasonal workers and volunteers during the summer months. There is no lodging for park staff within the Park, and all employees reside outside the park.

There are several concessions operations in Rock Creek Park. Guest Services Inc. (GSI) operates snack bars at the Tennis Stadium and the Carter Barron Amphitheater. Golf Course Specialists, Inc. operates the public golf course in the northern part of the Park, including a snack bar and pro shop. The Rock Creek Horse Center rents horses for trail rides and operates the National Center for Therapeutic Riding at their indoor facility.

map park
(not printed)

Chapter Two: Solid Waste Management in Rock Creek Park: Quantities, Costs, and other Considerations

This chapter describes in detail the solid waste system operating within Rock Creek Park. It characterizes current solid waste generation and its composition, and develops cost estimates for the current programs. Chapter 3 describes some alternate waste management options for the park.

Overview of Solid Waste Management Practices in Rock Creek Park

The Maintenance Division of Rock Creek Park directly provides trash collection to all public areas in the park. During the summer months, fifteen employees are assigned to solid waste duties, either directly collecting trash from roadside cans and picnic areas, or litter picking. This number drops to four employees during the winter months.

The Park has a multi-faceted solid waste program

Solid waste collection is done with three rear-loading packer trucks, each of which can hold seventeen cubic yards of waste. Two or three park employees staff each truck. Crews transfer the waste from 30-gallon trash cans located in picnic areas and certain trail areas to the packer truck. After they have completed their designated collection route, the crews dispose of the garbage at the Fort Totten transfer station in northeast Washington. The frequency of collection on each route varies by season.

The park contracts with a waste hauler to place a dumpster at the maintenance yard to dispose of debris, including white goods (refrigerators, etc.) illegally dumped in the park. This 30-cubic yard container is hauled away every two to three weeks. Browning-Ferris Industries (BFI) assumed responsibility for this contract April 1, 1995.

BFI also handles manure disposal from the two Park Police stables in Rock Creek Park. They leave a 20-cubic yard container at one of the stables, and haul it away when it is full. Maintenance Division crews load the dumpster and transport the manure from the second Park Police stable to the dumpster. The contract calls for BFI to haul the dumpster away twenty times per year.

The park regularly chips downed trees and limbs to create mulch, which are then used for a variety of purposes throughout the park. Rock Creek also participates in a once-

a-year wood mulching program funded through the regional NPS office.

The park has several small recycling programs in place at this time. One program, targeting visitor-generated aluminum containers, is found at Picnic Grove #6. These containers are monitored by Maintenance Division staff, and the cans are donated to a local nonprofit organization that picks them up from the maintenance yard. Aluminum cans generated in park administrative and maintenance offices are also collected and donated to this organization.

A second program targets office paper generated in administrative offices around the park. The paper is collected every Friday by PSI, a nonprofit organization employing disabled individuals. This service is free to the park.

The park relies on a regional hazardous materials contract to recycle tires and solvents. Waste oil is recycled through a separate contract administered by the park. The park's battery supplier recycles old truck and automotive batteries on an informal basis.

Solid Waste Generation

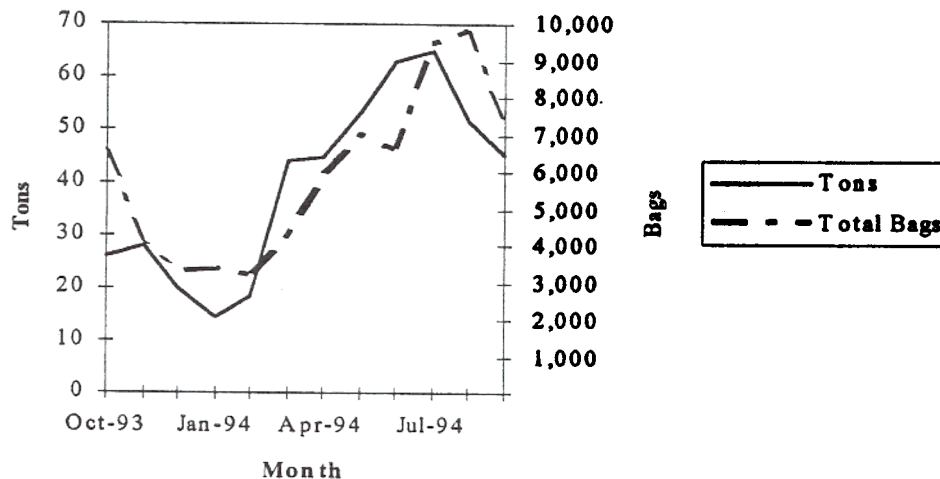
It was not possible for us to precisely estimate the total quantity of solid waste generated within Rock Creek Park. Currently, Rock Creek trash vehicles tip at the Fort Totten transfer station. Although each time a truck tips it is issued a weight ticket, billing is not based on this information. Instead, the National Capitol Region office allocates Rock Creek a fixed percentage of the fees incurred by parks from the region which tip at the transfer station.¹ We were unable to obtain any information about how or when this formula was developed. It is possible, therefore, that the current billing formula over- or understates the park's actual tonnage. In FY 1994 (10/93-9/94), the allocation formula assigned Rock Creek Park responsibility for 473 tons of solid waste.

The graph below tracks solid waste tonnage for the park, as calculated by the NCR billing formula. Chart 1 also tracks total bags collected by park staff, as reported on the Maintenance Management Program (MMP). Although the figures track relatively well, there are some discrepancies which suggest the billing formula may no longer be accurate.

¹NCP-Central = 36%, NCP-East = 36%, Rock Creek Park = 16%, President's Park = 6%, White House Liaison = 6%)

Chart 1

Rock Creek Park Waste Tonnage



In addition to waste collected by Park Service crews from public areas and administrative offices, the Maintenance Division fills a 30-cubic yard dumpster approximately once every two to three weeks with debris and other bulky wastes left in the park. The two Park Police stables in the park generate another 100 cubic yards of manure every month, weighing roughly 60 tons. Snack bar and recreation facility concessioners in the park also generate some unknown quantity of waste. Finally, some unknown but small amount of recyclables is generated every month at park service offices and Picnic Grove #6. The above tonnage estimates do not include any of these four categories of waste.

Waste Stream Analysis

Rock Creek Park has not conducted a waste characterization study of waste generated within the park. However, based on information from another National Park, we can estimate the characteristics of specific waste generating activities such as picnic areas. The estimated quantities of each waste material are as follows.²

²A waste composition study performed at Yellowstone National Park characterized waste generated at day-use facilities, such as picnic areas and roadside turnouts.. Waste composition in Rock Creek Park is based on this study.

Table 1
Rock Creek Park
Estimated Solid Waste Composition and Quantities

| Material | % of waste stream | Estimated tons/year |
|---------------------------|-------------------|---------------------|
| Paper | 31.6% | 149.4 |
| Mixed Paper | 10.1% | 47.8 |
| Newspaper | 1.4% | 6.8 |
| Corrugated cardboard | 20.0% | 94.7 |
| Glass (all colors) | 19.4% | 91.9 |
| Metals | 6.4% | 30.3 |
| Ferrous | 3.6% | 17.1 |
| Aluminum | 2.8% | 13.2 |
| Organics | 31.8% | 150.3 |
| Wood | 0.7% | 3.4 |
| Food waste | 18.1% | 85.4 |
| Yard waste | 0.7% | 3.4 |
| Other organic | 12.3% | 58.1 |
| Plastics | 2.9% | 13.7 |
| HDPE | 0.7% | 3.4 |
| PET | 0.7% | 3.4 |
| LDPE | 1.4% | 6.8 |
| Misc. | 7.9% | 37.4 |

Note: Numbers may not add up due to rounding.

Waste Collection

Currently Rock Creek Park uses three rear loading packer trucks staffed by Maintenance Division crews to collect waste materials in the park, with each truck targeting a different section of the park. Crews collect waste placed in the 920 30-gallon trash receptacles located around the park.

The cost of waste collection was partially determined from the MMP database, which provides the direct costs associated with solid waste collection in the park. It does not include costs for overhead or depreciation on capital items, which we have estimated. Collectively, in 1993-4 Rock Creek Park spent \$322,493 on solid waste collection, or \$681/ton. An additional \$30,470 was spent on disposal of this material at the Fort Totten transfer station, increasing total system costs to just over \$745 per ton.

Table 2
Solid Waste Program Cost Estimate³

| | |
|---------------------------------------------------------------------------------------------------------|------------------|
| MMP Code 3200 (Litter pickup) | \$146,104 |
| MMP Code 3210 (Trash removal) | \$ 90,785 |
| Overhead (25%) | \$ 59,222 |
| Vehicle Capital Cost | <u>\$ 26,382</u> |
| Total Annual Collection Cost | \$322,493 |
| Annual tonnage | 473.21 tons |
| Collection Cost per ton | \$ 681.50 |
| Transfer station tip fee | \$ 30,470 |
| Total System Costs | \$352,963 |
| Total System Cost per ton | \$ 745.89 |
| Note: Vehicle Capital Cost assumes 7 year life, \$50,000 purchase price, 6.1% interest rate on purchase | |

This is a tremendously high cost, even when compared with other National Parks that are geographically isolated and thus more likely to have high transportation costs. Some possible explanations for the higher costs include:

- Use of 30-gallon trash cans rather than dumpsters
- Higher collection costs due to greater litter volumes, traffic congestion, and other causes
- Inefficient vehicle routing and collection schedule

It was beyond the scope of this report to fully examine each of these explanations in detail.

³Estimate does not include the cost of any recycling efforts, manure collection and disposal, debris removal contract, or the regional wood chipping contract. This estimate refers only to the collection and disposal of material generated in public areas and at Park Service offices.

However, based on our analysis, the most likely explanation lies in the use of a large number of 30-gallon trash receptacles.

Labor costs for "litter picking" (MMP Code 3200) seem high compared to those costs for "empty trash containers" (MMP Code 3210). According to Rock Creek MMP records, litter picking constitutes 62% of the solid waste cost at Rock Creek. (By contrast, litter picking accounts for only 5% of the solid waste labor costs at the George Washington Memorial Parkway, a nearby park with similar visitation patterns. In a recent study of the South Rim of the Grand Canyon, litter picking accounted for 38% of the solid waste labor cost.) The high cost at Rock Creek is partially explained by the high visibility of the park. Many high ranking government officials travel through the park every day, and park managers quickly respond to reports of litter in the park.

Recycling Collection

The Park operates a very limited program for the collection of aluminum. At Picnic Grove #6, aluminum is collected in three 30 gallon containers set up in a "cluster" formation.⁴ We were unable to estimate current aluminum capture rates, or how frequently the cans are emptied.

Park staff noted that contamination of the container at Picnic Grove #6 is a problem. One possible explanation is that the sign is too small to effectively serve an area of that size. National Capital Region officials also report that contamination is a problem at other parks in the region using this type of bin.

Waste Disposal

Solid waste from Rock Creek Park is transported to the District of Columbia's transfer station at Fort Totten. The tipping fee at the transfer station is \$64.39. This material ends up at the Energy/Resource Recovery Facility (E/RRF) in Lorton (VA), which is not scheduled to close until the year 2015. It does not appear as if the park will be forced to look for alternate disposal sites in the near future.⁵

⁴The "cluster" refers to a trademarked commercial bin design, where between one and three containers encircle a central sign indicating this is a recycling station.

⁵According to officials at the Metropolitan Washington Council of Governments, the District of Columbia is investigating other disposal options that may be less expensive than the E/RRF. Currently, there is a surplus of disposal capacity in the region, and any switch by the District to a new disposal location will likely result in lower tip fees for the Park.

Recycling Processing

Although no significant quantities of recyclable materials are currently collected from Rock Creek Park, should a program be established there are many outlets for materials in the Washington area. The widespread availability of processing allows the park to develop a program that suits its needs without worrying about the availability of markets.

The main recycling processing opportunities include:

District of Columbia dropoff site: The District currently operates a recyclables dropoff facility Monday through Friday from 8 a.m. to 4 p.m. at the Fort Totten transfer station. This location accepts most recyclable materials, including corrugated cardboard, magazines, phone books, all colors of glass containers, aluminum and steel containers, aerosol cans, and HDPE (#2) and PET (#1) plastics. Commingling of materials is acceptable. There is no tip fee, but there is also no payment for any of the higher value materials, such as aluminum. It is not clear how the District's recent budget problems will affect the operation of this site.

Eagle Maintenance. A privately held concern, this company operates a commingled materials recovery facility (MRF) in Capitol Heights, Maryland. In the fall of 1995, they will open a commingled MRF in the District itself. Materials currently handled include: all colors of glass, HDPE, PET, and some polystyrene plastics, aluminum, other metal containers, newspaper, and high grade paper. The facility accepts material from any hauler. The tip fee varies by the type of material: commingled glass/plastic/metal costs \$25-\$35/ton, high grade paper is \$0/ton, while they pay \$320/ton for aluminum.

Laidlaw Recycling. A privately held firm, this company also operates a commingled MRF in Capitol Heights, Maryland. Materials currently handled include: all colors of glass, HDPE and PET plastics, aluminum, other metal containers, newspaper/magazines, and several grades of paper. This facility accepts material from other haulers. The tip fee varies by the type of material: commingled glass/plastic/metal cost \$30/ton; corrugated cardboard and/or newsprint is \$10/ton; while they pay \$360/ton for aluminum (or \$80/ton for mixed metal and aluminum containers).

Chapter Three: External Influences on Future Solid Waste Management Practices in Rock Creek Park

There are three factors that will undoubtedly affect the park's future solid waste management practices. Two are regulatory, while the third is a growing public expectation that recycling services should be available in a variety of settings, including parks.

Executive Order 12873 (Federal Acquisition, Recycling, and Waste Prevention)

Signed by President Clinton in October 1993, the Executive Order is primarily concerned with "affirmative procurement" practices, although the order does require each agency to "incorporate waste prevention and recycling in the agency's daily operations" if the program is "consistent with the demands of efficiency and cost effectiveness." Thus far the Interior Department has not established formal guidelines on how the National Park Service should comply with the Executive Order. Ultimately, Rock Creek can expect that some type of recycling and waste reduction goals will be set for the park.

36 CFR Part 6 -- New NPS Solid Waste Rules

On January 23 of this year, new federal rules restricting the creation of new solid waste disposal sites in National Parks went into effect. Although on its surface the rules would appear to have little to do with Rock Creek Park, there are two relevant provisions that affect future solid waste operations in the park. First, Section 6.8 requires each park unit to carry out 40 CFR Part 244, another rule mandating the establishment of a deposit system for carbonated beverage containers sold by concessioners. In other words, GSI, the contractor running the snack bars at Carter Barron and the Tennis Center would have to impose a nickel deposit on any carbonated beverages sold in cans or glass containers. GSI would also have to accept for redemption any containers for which they collected a deposit.⁶

Section 6.8d of the rule also requires "NPS concessioners, commercial use licensees, and contractors [to] comply with acquisition, *recycling and waste minimization goals established by the NPS.*" [Emphasis added.]

Currently, concessioner recycling efforts in the park are modest. The two Guest Services Inc. snack bars (at the Carter Barron Amphitheater and the Rock Creek Tennis Center) report that

⁶Because there is no beverage container deposit system in place in the Washington D.C. area, GSI may have to implement some type of identification system (stamp, etc.) to denote containers sold by their operation. Failure to do so may make them liable for redemption of containers on which they did not collect a deposit.

they do not currently have any recycling program in place. The same is true for the Rock Creek Golf Course.

The Rock Creek Horse Center has a small office paper and aluminum recycling program for its offices, which they self-haul to a recycling facility. The Center also tries to put the manure and bedding material generated by their sixty horses to good use, giving it away to the public or hauling it to mushroom farmers in Pennsylvania. Recently, however, the Center has had a difficult time disposing of this material, and we estimate they currently have a stockpile of over 300 cubic yards of manure and bedding stored behind their barn.

Public Expectation

Public expectation is yet another important factor that will affect the park's solid waste management practices. To many people, a park is an obvious place to have a recycling program, given that parks are partly intended to reflect an appreciation for natural resources and sustainable management practices. Because other National Park sites in the Washington area have recycling programs, it is not unreasonable for the public to assume they should find recycling bins at all NPS facilities in the region.

Chapter Four: Alternate Waste Management Strategies

Several features of the park's current solid waste system stand out as the park explores ways to increase diversion and reduce costs. These include the use of three rear loading packer trucks to collect the garbage; the reliance on 30-gallon trash containers throughout the park; the lack of any comprehensive recycling or waste prevention program in the park; and the availability of large quantities of compostable material in the park.

In this chapter, we'll discuss how Rock Creek Park might modify its trash collection, recycling, and composting practices. The pros and cons of various strategies are discussed, along with the projected cost implications of each strategy.

Trash Collection Options

Table 3 on the next page summarizes three alternatives to the existing 3-truck strategy, which we called Option 1:

- Option 2 involves moving all trash cans to the roadside or next to parking lots
- Option 3 involves switching from cans to dumpsters, and contracting out collection
- Option 4 involves switching from cans to dumpsters, but maintaining the Park Service's role in collecting the waste

The alternatives all share one common thread -- the notion that the existing strategy of placing the park's trash receptacles out in the middle of picnic and other visitor areas is a costly one. It is costly in terms of the amount of time it takes crews to empty the cans (because they are so widely scattered); it is costly in terms of the toll it takes on the lawn areas (the packer trucks compact the soil, particularly after it has rained); and it is costly in terms of the toll it takes on the vehicles themselves. (According to park maintenance staff, the trash collection trucks require occasional repairs because they have damaged an axle driving over curbs and through the grassy areas.)

We believe there is merit to consolidating the trash bins, either through eliminating them entirely (and replacing them with large 4 or 8 cubic yard dumpsters) or simply moving them closer to parking lots or the roadside. In both cases, the time spent removing the trash from the park should be reduced because the receptacles will either be fewer in number or simply closer together. Because collection is faster, fewer trucks and personnel may be required, at significant cost savings. We are aware that such a move may increase litter levels in the park, but we believe the experience of other parks, particularly those where trash cans have been eliminated, shows fewer trash receptacles don't necessarily translate into a dramatic jump in

Table 3
Alternate Trash Collection Strategies

| Option | Pro | Con | Cost |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 1: Status quo | <ul style="list-style-type: none"> - Infrastructure (vehicles & staffing) already exists - Park has maximum control over day-to-day staffing levels and quality of work | <ul style="list-style-type: none"> - Current system is costly - Collection trucks sustain damage and damage turf from driving on lawn areas - Painted metal trash cans require regular maintenance and replacement | <p><u>Ongoing expenses:</u> Litter collection (labor, benefits, vehicle) = \$182,630/year Trash collection (labor, benefits, vehicle) = \$139,404/year Disposal cost = \$30,470/year</p> <p>Total system cost = \$352,504/year</p> |
| Option 2: Move all trash cans to roadside or adjacent to parking lots | <ul style="list-style-type: none"> - Infrastructure (vehicles & staffing) already exists - Park has maximum control over day-to-day staffing levels and quality of work - Collection of trash may be slightly faster than current system (10% is assumed) | <ul style="list-style-type: none"> - Current collection system is costly - Collection trucks sustain damage and damage turf from driving on lawn areas - Painted metal trash cans require regular maintenance and replacement | <p><u>One-time expenses:</u> Removal and re-installation of 90% of trash cans (@ \$200 per can) = \$165,600 (see annualized cost below)</p> <p><u>Ongoing expenses:</u> Litter collection (labor, benefits, vehicle) = \$182,630/year Trash collection (labor, benefits, vehicle) = \$125,464/year Disposal cost = \$30,470/year Annualized cost of can relocation = \$38,511/year</p> <p>Total system cost = \$377,075/year (\$24,571 more than existing system cost)</p> |
| Option 3: Eliminate 30 gallon trash cans, install 4 cy or 8 cy dumpsters at all appropriate sites, contract out trash collection services | <ul style="list-style-type: none"> - Eliminates damage to park vehicles and turf in group picnic areas - Employees currently assigned to trash collection duties (6-9 people during peak season) can be reassigned to other duties - Contractor assumes all responsibility for dumpster maintenance - Litter levels should decline due to larger containers (10% reduction is assumed) | <ul style="list-style-type: none"> - Collection contract would be costly - Park gives up some control over trash collection schedule and performance - Park must build a concrete pad for each dumpster in a location easily accessible to the contractor's vehicle - Park must now pay for dumpster rental (or purchase) - Dumpsters are relatively unattractive; park will likely want to build some structure to mitigate the appearance | <p><u>One time expense:</u> Installation of 45 concrete pads and fencing @ \$3000/site = \$135,000 (see annualized cost below)</p> <p><u>On-going expense:</u> Litter collection (labor, benefits, vehicle) = \$164,367/year Trash collection/disposal contract = \$144,188/year Disposal cost = \$0 (built into fee) Annualized cost of dumpster pad = \$18,067/year</p> <p>Total system cost = \$326,622 (\$25,882 less than existing system cost)</p> |

| | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Option 4: Eliminate 30-gallon trash cans, install 1 cubic yard dumpsters at all appropriate sites, Park Service responsible for trash collection</p> | <ul style="list-style-type: none"> - Eliminates damage to park vehicles and turf - # of trash containers requiring annual maintenance is reduced - Park can likely eliminate one trash collection route due to increased efficiency of system (savings of 2-3 staff during peak season + vehicle cost) - Litter levels should decline due to larger containers (10% reduction is assumed) | <ul style="list-style-type: none"> - Park must install winch system on trash collection trucks to help empty dumpsters into hopper - Park gives up some control over trash collection schedule and performance - Park must build a concrete pad for each dumpster in a location easily accessible to the contractor's vehicle - Park must now pay for dumpster rental (or purchase) - Dumpsters are relatively unattractive; park will likely want to build some structure to mitigate the appearance | <p><u>One time expense:</u> Cost of winch system for trucks = \$3,000 Installation of 45 concrete pads and fencing = \$135,000 (see annualized cost below)</p> <p><u>On-going expense:</u> Litter collection (labor, benefits, vehicle) = \$164,367/year Trash collection (labor, benefits, vehicle) = \$93,400/year Disposal cost = \$30,470/year Annualized cost of dumpster pad = \$18,067/year Dumpster rental @ \$30/mo. = \$16,200/year</p> <p>Total system cost = \$322,504 (\$30,000 less than existing system cost)</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Notes:

- Option 2 -- Assumes 90% of all trash cans in park must be relocated
-- Assumes litter collection costs remain constant
-- Assumes trash collection costs decline 10% due to increased speed of collection
-- Annualized cost of can removal/reinstallation calculated at 6.1% interest over 5 years
- Option 3 -- Assumes placement of 30 dumpsters in picnic areas, plus 15 other dumpsters around the park
-- Litter collection costs assumed to decline 10% due to switch to dumpsters
-- Trash collection costs based on contract cost at GWMP
-- Assumes 22 dumpsters are 4 CY, 23 bins are 8 CY containers
-- Annualized cost of dumpster pad + installation calculated at 6.1% interest over 10 years.
- Option 4 -- Assumes placement of 30 dumpsters in picnic areas, plus 15 other dumpsters around the park
-- Litter collection costs assumed to decline 10% due to switch to dumpsters
-- Trash collection costs assumed to decline by 1/3 due to elimination of one truck route
-- Annualized cost of dumpster pad + installation calculated at 6.1% interest over 10 years.

litter levels. Most users in the park recognize they have a role in helping to keep the park clean.

Most parks which use dumpsters rely on front-loading collection vehicles. Such a truck can simply drive right up to the container, pick it up, and dump it without forcing the driver to get out of the vehicle. Because Rock Creek does not have a front-loading packer, Option 3 explores contracting out collection to a private hauler. Option 4 retains the use of park crews and vehicles to empty the dumpsters, but requires the installation of a winch system on the back of each existing truck to help tip the dumpster into the rear of the packer truck. Two employees would be required to work each truck to help wheel the dumpster into position before dumping.

Analysis

We estimate that total program costs will increase by approximately \$25,000/year under Option 2, decline by approximately \$26,000/year under Option 3, and decline by \$30,000/year under Option 4. Option 2 provides little savings because of the high cost of relocating the existing trash receptacles. Options 3 & 4 assume litter costs will decline slightly, because there is less likelihood that the dumpster will overflow and trash will blow around. If litter collection costs decline by more than the 10% rate used in our calculations, total cost savings under Options 3 & 4 will be even greater.

To project contractor costs under Option 3, we relied on cost data from the BFI trash contract with other parks in the area. The projected \$144,000/year contract cost, which includes disposal, is \$25,000 lower than the amount currently expended on trash collection and disposal. Under Option 4, collection costs are expected decline by approximately \$46,000 over current levels, due to the consolidation of the three existing trash truck routes into two routes. Because it will no longer be necessary to empty each container daily, two crews should be able to complete the collection routes around the park.

Recycling Collection Options

Table 4 summarizes two different collection options for visitor-generated recyclables at Rock Creek Park. Both options assume a commingled collection program featuring a dual sort: aluminum and other metal containers are collected in one bin, while glass and HDPE (#2 plastic) and PET (#1 plastic) containers are collected in a second bin.

We believe the materials cited above are the most appropriate for a recycling program targeting visitor-generated waste in Rock Creek. Such a program minimizes the amount of sorting the public must engage in; the materials are ones commonly recycled at homes and offices; and there is sufficient processing capability for these materials in the Washington region. We do not advocate collecting polystyrene (PS) plastic, as is done on the Capitol

Mall, because this will limit the park's options for processing the recyclables.

We excluded a third program option, where the materials are collected completely source separated, because of concerns over excessive contamination.

We have again divided the two options into one where Park Service crews do the collection, and one where this responsibility is contracted out. **Whatever the option chosen, a recycling program will require resources beyond those currently expended by the park.**

Analysis

Option 1 contracts out all collection and processing of commingled recyclables. The closest approximation for the cost of this system is the commingled recycling contract currently in place for the National Mall. Using cost figures from this contract, the estimated cost for a similar program at Rock Creek is \$26,200/year. For our calculations, we assume a four day/week collection schedule during the months of April - October, and once a week collection the balance of the year. We also assumed that this program captures 61 tons of recyclable materials each year from 45 recycling stations located around the park.⁷

Under Option 2, maintenance division crews collect the bagged recyclables and transport them to a processing center for handling and sale. The cost for containers and installation is approximately \$300/container. We estimate that a single driver could service the entire park on a five day/week schedule during the peak season⁸ and one day per week during the off-peak season. For our cost analysis, we assumed that existing staff is unavailable to carry out these duties, meaning our estimate includes the full salary of one additional employee. (We made a similar assumption about the availability of a vehicle.) If Rock Creek can staff this program with existing staff and vehicles, our estimated program cost of \$36,749/year will go down substantially.

⁷ Assumes Rock Creek captures recyclable materials at the same rate achieved by Yosemite National Park: 50% of all glass generated in the park (or ~46 tons), 16% of Ferrous (2.7 tons), 75% of aluminum (9.9 tons), 70% of HDPE 2.4 tons), and 10% of PET (.3 tons).

⁸ Collection is more frequent than under the contracted service option because the containers are smaller than the toters which would likely be used by a contractor.

Table 4
Alternate Recycling Strategies

| OPTION | PRO | CON | COST |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 1: Toter-based system; contract out all collection and processing responsibilities | <ul style="list-style-type: none"> - Frees park from day-to-day responsibility for program - Toters often provided for free or at minimal cost by contractor - Maintenance of recycling bins falls on contractor | <ul style="list-style-type: none"> - Currently no budget for contract - Toter systems more susceptible to contamination because of design of openings - Toters may not fit with desired "appearance" of park - Depending on contract, park may or may not receive financial credit for value of materials collected | <p><u>On-going expenses:</u> Collection contract cost = \$27,082 Material processing cost = \$3,050 Reduction in tip fees = -\$3,926</p> <p>Total cost = \$26,206</p> |
| Option 2: Bag-based system; park crews responsible for collection and transport of the recyclables | <ul style="list-style-type: none"> - Park has greater control of structure of program, can modify collection schedule immediately to adjust for sudden changes in visitation - Park has more control over design/appearance of collection bins - Less contamination of the recyclables is likely due to improved collection bin design | <ul style="list-style-type: none"> - Park would either require additional personnel or be forced to divert staff from existing duties - Park would either require a new vehicle or be forced to divert a vehicle from existing duties - Park must purchase recycling bins - Park must purchase liner bags for recycling bins - Park now forced to monitor market prices of materials at different processing facilities to ensure maximum return for value of recyclables | <p><u>One time expense:</u> Cost of recycling bins @\$300 each = \$27,000 (see annualized cost below) Cost of new truck = \$25,000 (see annualized cost below)</p> <p><u>On-going expense:</u> Cost of new staff = \$28,000/year Annualized vehicle cost = \$3,346/year Annualized recycling bin cost = \$6,279 Processing cost = \$3,050/year Reduction in disposal fees = -\$3,926</p> <p>Total cost = \$36,749</p> |

Notes:

- Option 1** - Assumes one recycling station at each picnic area, plus 15 stations distributed elsewhere around the park
- Collection cost estimate based on contract cost of collection at the National Mall (\$186.77/day). Although the Mall has more bins than we suggest for Rock Creek, they are closer together than bins in Rock Creek. We believe these effects offset each other and the actual price should be close to this level.
 - We assume the vendor would prefer to use 96-gallon rolling toters because they can be mechanically lifted into the collection vehicle.
 - Processing cost is assumed to be the same as that charged for the National Mall contract. (\$50/ton)
 - Collection frequency assumed to be 4 days/week during peak season, and 1 day/week during non-peak.
- Option 2** - Assumes full cost of 1 FTE for collection and transport of materials
- Annualized cost of the bins calculated at 6.1% over 5 years
 - Annualized cost of the stakebed truck calculated at 6.1% over 10 years.
 - Assumes park crews transport all collected materials to a processing facility at the end of each day they are collected.
 - Collection frequency assumed to be 5 days/week during peak season, and 1 day/week during non-peak.

Composting Options

Rock Creek generates a variety of compostable organic materials -- leaves, grass, downed tree limbs, food waste from picnic areas, and manure from the stables. But because grass trimmings are already left on the lawn areas, leaves are blown back into the woods, and food waste collection is subject to tremendous contamination problems, downed tree limbs and manure are the most likely candidates for composting.

The park already chips fallen tree limbs, using the mulch around the park. Composting the mulch by itself would not add much value, and would come at some cost. However, if the mulch were combined with the 60 tons of horse manure generated every month at the Park Police Stables, Rock Creek has the ingredients of an excellent compost mixture.

Currently the park pays BFI to periodically haul away a 20-cubic yard container of manure from one of the stables. Maintenance division crews are responsible for transporting manure from the other Park Police stable to the dumpster.

An in-park composting option is worthy of consideration as an alternative to the BFI option because the manure represents a valuable material that could eliminate the need for the park to purchase fertilizers and other soil amendments.

Analysis

The most likely location for a composting program in the park is the back lot of the maintenance yard. A 50' x 100' section covered by crushed stone or asphalt/concrete could serve as a composting pad. By constructing windrows 4' high and 8' wide, Rock Creek can fit three 100' windrows on the pad. Three windrows allow the park to compost 1250 cubic yards of manure per year, which is roughly the generation rate from the two Park Police Stables. Since composting tends to reduce the volume of organic material in half, the park would produce approximately 625 cubic yards of compost every year.

On a site of this size, each windrow must decompose and "cure" in 15 weeks, or else the park will run out of space. Given the relatively small size of the windrows, this should not be a problem. If the park purchases a "straddling" composter, six windrows could fit on the same pad, doubling the allowable composting time and giving the park extra storage space.

A composting program costs approximately \$5,600/year for labor (assuming eight hours/week of one employee), and between \$3,000 and \$5,400 for equipment, depending on the type of windrow turner selected. After subtracting out the cost of peat moss and other soil amendments that the park would no longer have to purchase, **the composting program would either be less expensive than or roughly comparable to the cost of the BFI manure hauling contract.**

Table 5
Alternate Composting Options

| OPTION | PRO | CON | COST |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option 1: Status quo (BFI contract) | <ul style="list-style-type: none"> - Park may be inappropriate location for composting operation - Storage yard remains available for many purposes | <ul style="list-style-type: none"> - Hauling compostables off site removes a valuable resource from the park - Cost of hauling is fairly significant | <p><u>On-going expense:</u> Contract cost = \$6,728/year (projected 12 month cost at 1995 rate)</p> |
| Option 2: On-site composting (Back lot of maintenance yard) | <ul style="list-style-type: none"> - Valuable commodity stays in park, saving park cost of soil amendments currently purchased - Soil erosion and compacted soil problems would decrease due to increased availability of soil amendments | <ul style="list-style-type: none"> - Windrow turning equipment needed - Need approximately 5,000 sq ft of space in maintenance yard for windrow operation - Staff time + expertise needed to effectively manage composting operation - Concern over leachate runoff may require installation of a concrete or asphalt pad - Would likely require siting approval of District of Columbia Board of Health | <p><u>One time expense:</u> Cost of windrow turning equipment = \$12,000 - \$26,000 (see annualized cost below) Cost of windrow sheathing (optional) = \$850 - \$1,700 Cost of crushed stone for composting pad = \$1,700 (cost will be higher if paved surface is required)</p> <p><u>On-going expense:</u> Labor cost (including benefits) = \$5,600/year Annualized cost of windrow turner = \$1,606 - \$3,480/year (varies depending on type of equipment selected) Reduced expenditures on soil amendments/fertilizer = -\$1,800/year</p> <p>Total system cost = \$5,406 to \$7,280 (-\$1,322 to +\$552)</p> |

Notes: -- Neither option includes the cost of park maintenance crews hauling manure from Park Police stables, since some level of hauling is required under both scenarios.

Chapter Five: Recommendations and Conclusion

Rock Creek currently spends approximately \$353,000 per year to manage its solid waste. We believe there are several steps the park can take which would decrease this cost, bring the park into compliance with recent federal recycling and waste reduction requirements, and improve the park's environmental management of its solid waste.

Trash Collection Recommendations

First, we recommend that the park work with the National Capital Region office to reevaluate the billing formula which allocates Rock Creek a fixed percentage of the waste tipped by NPS vehicles at the District's transfer station. There is good reason to believe the formula overstates current waste generation levels. Any change could mean a lessening of the fee the park pays each year to dispose of its waste.

NPS cost impact: unknown

Second, we recommend that the park switch from its current reliance on 30-gallon trash cans to larger dumpsters. Litter levels should decline, collection frequency should decline, and the cost of collecting the material should decline, regardless of whether the Park chooses to collect the material itself or contract out this function.

Although the numbers favor the park retaining responsibility for trash collection, we suggest contracting out collection in at least some of the park. Not only will this provide park management a comparison with the cost of using maintenance division crews, but it also provides valuable information about how litter levels will decline without requiring a huge investment in truck modifications, dumpster pad construction, and dumpster rental.

NPS cost impact: savings of \$ 26,000 - \$30,000/year

We also believe the park should inventory where it places waste receptacles to determine if there are sections of the park where they are unnecessary. For instance, Palisades and Battery Kemble Parks are very isolated from the rest of the park, and use of these facilities is almost exclusively limited to residents of the surrounding neighborhood. The park should consider removing all trash receptacles from these locations, and erecting signs requesting visitors to take their trash and recyclables home with them. The park could then monitor litter levels and determine if there is any net savings.

NPS cost impact: unknown change in litter and trash collection costs

cost of new signs = \$500

Source Reduction Recommendations

With source reduction⁹ sitting atop the waste management hierarchy, it is time for Rock Creek Park to identify and carry out some initiatives that reduce the total amount of waste material generated in the park. The fact that the park is limited to day use makes this more difficult, but we believe the following recommendations can still provide long term benefits for the park. All can be done at minimal cost.

Source reduction guidelines for group picnickers -- Since a sizable portion of the park's waste stream comes from the group picnic areas, it makes sense to target groups using these facilities. Groups currently reserve a site in advance through the District of Columbia Parks Department.¹⁰ The park should send each group a tip sheet discussing the extent of the Rock Creek Park's solid waste problem, and how picnickers can reduce the amount of waste they generate.

NPS cost impact: \$400/year (assumes 1000 mailings)

Concessioner source reduction initiatives -- The park should require concessioners to carry out some source reduction initiatives that would result in less visitor-generated waste. One possibility is to require snack bar operators to offer a discount to customers who supply their own reusable cup. The discount should be significant enough to encourage the purchase and use of reusable cups. Another possibility is to require the concessioners to switch from selling drinks in cups to cans and/or bottles that can be recycled in the park's recycling program.¹¹ The park should also require concessioners to report annually on what they are doing to reduce solid waste levels. The park can share this information with other concessioners in the park and region.

NPS cost impact: \$0/year

Park Service Operations -- For internal operations, Rock Creek should adopt

⁹For our purposes, source reduction refers to the prevention of non-hazardous solid waste at its point of origin.

¹⁰Control over picnic area reservations will revert to the park in 1996, which will enhance the park's ability to carry out this recommendation.

¹¹Because concessioners are only authorized by the park to sell certain size containers at a set price (e.g., 8 oz cup for \$0.99), concessioners may need the flexibility to limit the discount too only those cups sold at their facility.

the following initiatives:

- Promote more widespread use of the park's internal E-mail system to foster paperless communication between park staff.

NPS cost impact: unknown savings

- Establish a policy restricting the purchase or leasing of new photocopiers to machines with double-sided copying capability. Currently, the park has three photocopiers, only one of which have double-sided copying capability. While this policy will only provide benefits once the machines are on site, it will provide long-term reductions in both paper consumption and waste generation.

NPS cost impact: unknown savings

- The park should formally notify all appropriate management units at the regional and Washington Headquarters office of the park's interest in using CC:mail for most correspondence. In instances where NCR/WASO deems it important for all employees to have a hardcopy version of a document, Rock Creek should request that NCR/WASO send no more than a small number of copies for posting at designated locations throughout the park. It is then the responsibility of each employee to regularly check these boards to read all postings.

NPS cost impact: unknown savings

Recycling Program Recommendations

Residential recycling programs achieve their greatest success by providing constant reinforcement to households on "how" and "where" to recycle. Public space recycling programs, including parks, have a much more difficult task. The constant turnover of visitors to that space, limitations on the usefulness of education materials, and a waste stream that emphasizes convenience all work against the success of the program. But throughout the National Park system, there are many examples of recycling programs that effectively capture a sizable segment of the waste stream generated by visitors.

We believe there are many things Rock Creek Park can and should do to expand its recycling program. These initiatives fall into the areas of visitors, concessions, and park operations.

Visitors -- Rock Creek should establish a collection system targeting aluminum and other metal cans, glass containers, and plastics in the most heavily utilized areas of the park. Specific design elements of our recommended program are as follows:

Collection Strategy: We recommend placement of two recycling bins (one for aluminum & other metal cans and one for glass and HDPE & PET plastics) next to the trash dumpsters located around the park. 45 recycling stations (with two bins/station) are required parkwide. Although the park may give up the right to income from the collected recyclables, we also suggest contracting out collection. Depending on the Park's preference, the park can either purchase its own recycling bins, or use totes provided by the contractor. Totes hold more material than the average recycling bin, so the frequency of collection may decline. On the other hand, totes are more prone to contamination than the average recycling bin.

If the park chooses to purchase its own bins, we recommend that Rock Creek use the same Rubbermaid "Ranger" bins as those used on the George Washington Memorial Parkway. They are a neutral brown color; require very little maintenance; provide adequate space for signage; and most important, are relatively inexpensive (\$75/bin; with installation the cost estimate is \$300/bin.) We also advise following the lead of the Parkway in bolting the bins to a concrete base to prevent theft and ensure that they are not blown over in a strong wind. Bins should be emptied four to five times per week during the peak season (April - October), and once per week the remainder of the year.

*NPS cost impact \$30,100/year collection contract
\$27,000 (optional bin purchase)*

Education strategies: We suggest a four-point recycling education program. First, send information about the park's recycling program as part of the picnic site reservation confirmation packet. Request that picnic organizers inform group members about the program. Second, post information about the program on public bulletin boards around the park. Third, when revising the official park map, incorporate information advising visitors to look for recycling bins while they are in the park. Fourth, post a sign next to each dumpster and recycling station requesting public cooperation in preventing litter and separating recyclables into the appropriate containers. (Costs are calculated based on three signs per site at \$200/sign.) We suggest explicitly stating that in 1994 the Park spent approximately \$350,000 on trash collection and disposal, and how the public can help reduce this cost.

*NPS cost impact: \$27,000 (one time sign purchase/installation)
\$400/year (assumes 1000 mailings)*

Concessions -- Currently, the recycling efforts of the four concession operations in the Park are weak. To comply with new NPS regulation 36 CFR Part 6.8d we suggest Rock Creek modify the maintenance agreement for each concessioner to reflect the

following:

- Require all office operations to have an office paper recycling program in place
- Require all retail or food service operations to have a corrugated cardboard recycling program
- Require all food service operations to have some type of recycling program that matches their operation. For instance, if they serve food in some type of easily recyclable container, they should have some type of recycling program for that material at their facility.
- Require all concessioners to prominently display sign(s) informing the public about how and what they can recycle in the park. These signs should refer to both the concessioner's and the park's program.
- Require the horse stable and golf course to dispose of all organic materials in an "appropriate" fashion. This can include giving away material to gardeners or nurseries, or other arrangements leading to the composting of the material. The goal here is to ensure that this valuable commodity is not disposed of in a landfill.
- Require the golf course operation to establish a battery recycling program for any discarded golf or maintenance cart batteries.

NPS cost impact: \$0/year

Rock Creek Park Operations

The park's internal recycling efforts seem satisfactory, although we believe paper and aluminum collection bins should be in every Park Service building in Rock Creek Park, rather than just the maintenance yard and the headquarters building.

NPS cost impact: \$500 (one time bin purchase)

Composting Program Recommendations

Approximately 10-15 years ago, Rock Creek Park had an active composting program. We believe it is time to revive the program for both cost and environmental reasons. First, a composting program can provide valuable organic material to the park at a cost less than or equal to the park's current contract to dispose of the material. Second, the park has a steady supply of organic material readily available, and it is a shame to remove them from the park like another unwanted segment of the waste stream. Third, compost produced in the park would eliminate the need for some or all of the soil amendments currently purchased. Assuming the Park has the staff available to effectively manage this program, a composting program deserves serious consideration.

***NPS cost impact: \$2,550 to \$3,400 (one time expense)
\$5,406 to \$7,280/year***

Conclusion

In designing a new solid waste system, Rock Creek Park will need to consider economics and its staffing capabilities in deciding how aggressively it wants to pursue compliance with federal solid waste directives. This analysis has described numerous options for the park to pursue in developing environmentally sensitive, and in some cases, cost effective solid waste management options.

These options ranged from privatizing portions of the solid waste collection system to large scale composting of park-generated organics and manure. All of the options described in this report represent proven technology used around the nation and in other parks. Implementation of these recommendations will help Rock Creek Park join the ranks of National Park sites with a truly comprehensive solid waste strategy.

Appendix 1: Glossary

Contamination -- any material or foreign object that hinders the processing of a recyclable material into a new product; commonly used to refer to garbage mixed in with recyclable materials.

Dropoff facility -- a facility where the public or businesses can drop off recyclables; for the user, a dropoff facility is typically cheaper (but less convenient) than some type of collection arrangement where a contractor comes to your business or residence to pick up the material(s).

Dumpster -- a collection container designed to hold a large quantity of trash or recyclables. Volume is typically measured in terms of cubic yards (CY) of material.

HDPE -- High density polyethylene plastic, usually used to make milk jugs.

High grade paper -- typically white office or computer paper that has a high market value because of the cleanliness and length of the paper fibers.

LDPE -- low density polyethylene plastic, usually used to make film plastic.

MMP -- Maintenance Management Program, a NPS computerized tracking system that records labor and equipment utilization for different tasks.

MRF -- materials recovery facility, a processing facility designed to sort recyclable materials and prepare them according to market specifications.

Packer truck -- a collection vehicle with a hydraulic arm that compacts the material collected to allow the truck to hold more material.

PET -- polyethylene terephthalate plastic, usually used to make soda bottles.

PS -- polystyrene plastic, usually used to make foam cups or packaging or hard plastic eating utensils.

Toter -- although this is technically a brand name, this term is often used generically to refer to a heavy-duty plastic wheeled cart that holds 55 or 96 gallons of material.

White goods -- large metal household appliances (e.g., stoves, refrigerators, etc.)